Third Annual Report

COMMISSION OF CONSERVATION CANADA

1912

Commission of Conservation

Canada

HON. CLIFFORD SIFTON, Chairman

JAMES WHITE, Secretary

REPORT

OF

THE THIRD

ANNUAL MEETING

HELD AT OTTAWA

JANUARY 16th

1912

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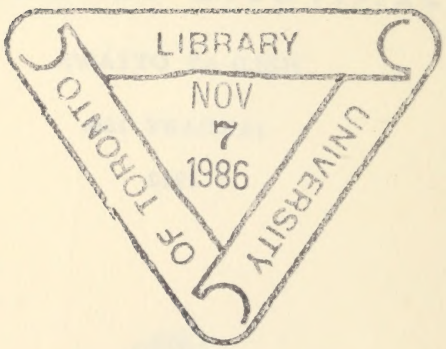
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To Field Marshal, His Royal Highness Prince Arthur William Patrick Albert, Duke of Connaught and of Strathearn, K. G., K.T., K.P., &c., &c., Governor General of Canada

May it Please Your Royal Highness:

The undersigned has the honour to lay before your Royal Highness the Third Annual Report of the Commission of Conservation for the fiscal year ending March 31, 1912.

Respectfully submitted

CLIFFORD SIFTON

Chairman

Ottawa, March 30, 1912

OTTAWA, March 29, 1912

SIR:

I have the honour to transmit herewith the Third Annual Report of the Commission of Conservation. This contains a report of the proceedings of the Third Annual Meeting, held in Ottawa on January 16, 1912, in which is included summary statements of the work done under the various committees of the Commission, during the fiscal year ending March 31, 1912.

I have the honour to be

Sir

Your obedient servant

JAMES WHITE

Secretary

HON. CLIFFORD SIFTON

Chairman, Commission of Conservation

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THIRD ANNUAL MEETING

OF

THE COMMISSION OF CONSERVATION

HELD AT

OTTAWA, JANUARY 16, 1912

THE Third Annual Meeting of the Commission of Conservation was held in the Carnegie Library, Ottawa, on January 16, 1912. The members of the Commission present were:
Hon. Clifford Sifton, Chairman.
Mr. Frank Davison, Bridgewater, N.S.
Dr. C. C. Jones, Fredericton, N.B.
Hon. Henri S. Béland, St. Joseph de Beauce, Que.
Hon. Martin Burrell, Ottawa.
Hon. Senator W. C. Edwards, Ottawa.
Sir Sandford Fleming, Ottawa.
Mr. C. A. McCool, Ottawa.
Dr. J. W. Robertson, Ottawa.
Dr. B. E. Fernow, Toronto.
Mr. J. F. Mackay, Toronto.
Rev. Dr. George Bryce, Winnipeg.

Morning Session

At ten o'clock the Chairman of the Commission called the meeting to order and said:—

Gentlemen: The time has come for us to attend to the duty that falls on us once a year of making a review of our work and of coming to the decisions that are necessary in connection with the work of next year. As usual, in all these things, there are, no doubt, many things that we ought to have done that we have left undone, but I

hope there are not many things that we ought not to have done that we have done. Thus, while we may be in fault in some ways, I trust we are not in fault in every way.

At former annual meetings, I have adopted the course of making a review of the work myself, but this year I came to the conclusion that we could improve on that method by having the officers of the various branches and one or two of the Chairmen of Committees who are in a position to do so, make statements as to the work which has been done in connection with the various branches of the Commission's activity. In this way, I think you will get a much more connected and definite report than you would from a desultory and rambling address from myself. Accordingly, this morning we shall have short statements relating to different sections of the work and showing briefly what has been done during the year. In this way, you will get a bird's eye view of the work which the officers and the Chairmen of Committees have been carrying on, in so far as they are able to explain these matters in a short space of time.

Then, this afternoon, we purpose having a short business discussion, and getting suggestions from members of the Commission as to the work of the next year where it is thought desirable to amplify it or alter it in any way. There are also a few points which the executive officers of the Commission do not feel like deciding without your authority. With these preliminary explanations we shall begin receiving reports from the various sections of the work of the Commission.

I shall ask Dr. Hodgetts to begin by giving us a *résumé* of what has been done in regard to matters of public health.

COMMITTEE ON PUBLIC HEALTH

Dr. Hodgetts said:—

The work carried on under the direction of the Committee on Public Health during the year 1910-11, may be summarized as follows:

Dominion Public Health Conference

The recommendations of the Conference of Dominion and Provincial Health Officers, which was held in Ottawa in October, 1910, were elaborated upon and subsequently presented to Sir Wilfrid Laurier, and discussed with him and also with the Hon. Sydney Fisher, late Minister of Agriculture. The following minute of Council was received thereon:

"P. C. 600

CERTIFIED COPY OF A REPORT OF THE COMMITTEE OF THE PRIVY COUNCIL, APPROVED BY HIS EXCELLENCY THE GOVERNOR GENERAL, ON THE 27TH MARCH, 1911

The Committee of the Privy Council have had under consideration, a communication from the Committee on Tuberculosis, Commission of Conservation, signed by C. J. Fagan, Convenor of Tuberculosis Committee, and approved by E. B. Osler, Chairman of the Public Health Committee of the Commission of Conservation, recommending:—

1. That the Federal Government give substantial assistance to encourage the establishment of new sanitoria and hospitals for consumptives:

2. That Crown Lands be set apart for the settlement of tuberculized persons:

3. That in the event of any system of workingmen's insurance being established, provisions be made, whereby tuberculized persons, if recipients of sick benefits, be required to take advantage of such sanitorium treatment as circumstances may permit of.

The Minister of Agriculture, to whom the communication was referred, states that with reference to the first and second recommendations, viz., the establishment of sanatoria and the setting apart of lands for the settlement of tuberculized persons, he is of the opinion that under the provisions of the British North America Act, any such proposed action would come under the purview of Provincial Governments and not under that of the Federal.

The Minister observes—with reference to the motion appended to the communication suggesting to the Committee that the Federal Government be asked to vote a sum of money each year to aid in the suppression of tuberculosis—that the Federal Government has given and does give a money grant to the Canadian Association for the Prevention of Tuberculosis, and he cannot see his way at the present time to submit a recommendation that another grant be made.

The Minister, therefore, recommends that an answer in the sense of this Minute, be sent in reply to this communication.

The Committee submit the same for approval.

(Sgd.) RODOLPHE BOUDREAU,
Clerk of the Privy Council.

The Honourable,
The Minister of Agriculture."

"P. C. 601

CERTIFIED COPY OF A REPORT OF THE COMMITTEE OF THE PRIVY COUNCIL, APPROVED BY HIS EXCELLENCY THE GOVERNOR GENERAL, ON THE 27TH MARCH, 1911

The Committee of the Privy Council have had under consideration, communications from the Committee on Central Council of Health and National Laboratory (with reference to the former) reporting that in its opinion,—

1. The needs of Canada demand a permanent National Council of Health to be established under the Commission of Conservation, etc.

2. The holding of an annual meeting of such Council.

3. Such Council shall advise both Federal and Provincial Governments on matters pertaining to Public Health.

4. That a National Public Health Laboratory be established.

5. That it would be advisable for the Commission of Conservation to send an officer to study and report upon the work and expenses of such laboratories in the United States, etc.

And the latter submitting detailed information respecting the establishment of laboratories, cost and maintenance thereof, etc.

The Minister of Agriculture, to whom the said communications were referred, states with reference to the first, second and third paragraphs of the report, that he is of opinion that it is competent for the Commission of Conservation to appoint a Committee with powers which it is suggested should be given to the National Council of Health and that it is unnecessary for the Government to take further action.

The Minister further states—with regard to number 4—that he approves of the establishment of a laboratory and recommends that the Government take steps to provide one:

That with regard to number 5, he is of opinion, if such a laboratory were established, that an investigation of the work carried on in such laboratories should be made by an officer of the Government.

The Committee submit the same for approval.

(Sgd.) RODOLPHE BOUDREAU,
Clerk of the Privy Council.

The Honourable,
The Minister of Agriculture."

As definite action had not been taken upon the above recommendation of Council when Parliament was dissolved last July, the subject matter therein contained has been again taken up with the Government and is under consideration.

Infantile Paralysis

Owing to the prevalence in Canada of the disease known as "Infantile Paralysis," regarding the cause and spread of which there is much to be learned, a series of questions thereon was prepared and sent to the members of the medical profession. The data received are being collated, and at as early a date as possible, a report will be issued.

Town Planning and Housing

Following the address given at the Second Annual Meeting in January last on Unsanitary Housing Conditions in Canada, a more extended study of existing conditions was made.

The work is most important as one bearing in the highest degree both upon the conservation of the lives of the infants and children of our country, and upon the physical, social and moral well-being of the people.

During the months of August, September and October, the Medical Adviser of the Committee visited the larger towns and cities of Great Britain and Ireland and Germany, to study problems of housing and rehousing. At the same time, information was obtained regarding the housing laws of these countries, and the manner in which they are administered. A detailed report upon these matters is now being prepared, and it is expected that recommendations will be made to the various provincial legislatures in regard to suitable laws for dealing effectively with these important questions.

In suggesting the work to be carried on by the Committee, it is felt that the importance of the town-planning and housing question commands a foremost place; not only is it necessary from the purely health standpoint, but it is of economic importance that the physical standard of our people should be of the highest character.

The work is of such magnitude that public opinion must be aroused before the necessary legislation can be hoped for. This might very properly engage the immediate attention of the Committee, and, to this end, it may be expedient to lend every assistance to those cities where the housing situation calls for more immediate and active effort, in order to bring about, at the earliest possible moment, the changes so essential to the well-being of thousands of our infant popu-

lation, as well as of those who to-day are the backbone of our national life.

As a model of what a Canadian city should be, both from the sanitary, the artistic and architectural, as well as from the town-planning aspect, nothing could be more effective than the setting apart of the cities of Ottawa and Hull, with their environs, as a Federal district under the government of a commission having full powers to re-plan the present city areas and with jurisdiction over the planning of the outlying areas as portions of the greater Ottawa.

Making Ottawa a model city in town-planning and housing would be of inestimable value as an example to the cities and towns of the Dominion, and would, perhaps, be the greatest factor in bringing about the desired results in this important branch of conservation work.

New Town Sites

In connection with the location of new town sites along the lines of the transcontinental and other railways, it would seem expedient that power should be vested in some central health authority, whereby all new sites should be approved of by that body after the plans had been filed and duly considered. Any subsequent changes or alterations should only be made upon the approval of that authority.

Rural Sanitation

In the interest of the rural population, it is no less essential that some attention be given to the housing provided for those whose lives are spent on the farms of Canada; for many of these people through ignorance lower their vitality, lessening their economic value to the state and often causing losses of life which could otherwise be prevented.

The question of farm sanitation, in its widest sense, is deserving of more attention. Two diseases may be more particularly mentioned, viz., typhoid (enteric) fever and tuberculosis. The former can, in many instances, be prevented by an intelligent oversight of the water supply and the disposal of excreta and refuse; while a better use of the plethora of sunlight and fresh air can be inculcated with benefit to the present and the rising generation.

With the object of preventing these and other diseases, and thereby adding to the productiveness of the farming community, it seems proper to recommend that a series of bulletins be prepared and distributed to this class of our citizens, such publications to deal with farm sanitation and rural hygiene in a popular and practical manner.

Federal Department of Public Health

While the general administration of public health matters has been relegated to the provincial governments, although not specifically mentioned in the British North America Act as a function of the provinces, there yet remains within the purview of the Federal Government, several most important branches of this subject.

With the object of giving greater efficiency to the work now being done, for better co-operation with the several provincial boards of health and for more effectually meeting difficulties and situations of an interprovincial character, it has already been repeatedly recommended that there should be a consolidation of the branches of public health work of the Federal Government under the Director General of Public Health as a deputy minister having direct control over a consolidated, and, therefore, a more efficient service.

Uniform Vital Statistics

Correct and accurate vital statistics are the basis of modern sanitation; they are the gauge whereby we judge of the progress made against diseases of all kinds, and whereby we obtain information for further advancement. It is essential that there should be a more uniform and systematic recording of births, marriages and deaths in Canada than there is at present. There must be some system which, while leaving to the provinces the collecting of the information, will allow of early and regular returns being made to a Dominion office, where they will be carefully collected and published from time to time. For national purposes, this must be uniform and, in some degree, under Federal control. Most properly it should be placed under the chief officer of the Dominion Health Department.

It should also be provided that the provincial boards of health make regular returns, at least weekly, of the morbidity and mortality of all communicable diseases. These might be required, particularly in view of the fact that the Dominion Government, through its postal regulations, permits of all such notifications being sent free by the Post Office Department.

The following memorandum has been submitted to Sir Edmund B. Osler, Chairman of the Public Health Committee:

Recommendations on the Consolidation of the Public Health Service of the Federal Government

There are at the present time, from forty to fifty medical men in the Federal Service, each performing duties coming under the head

of "Public Health." These officers are attached to one or other of the Departments of Agriculture, the Interior, Inland Revenue or Indian Affairs; and in the case only of the Department of Agriculture is there a departmental head possessed of professional knowledge and vested with the authority of a deputy minister, both of which qualifications are essential for a successful working of a branch where medical men are employed.

This arrangement leads to frequent overlapping, and, in some instances, not only duplication, but triplication of work, which is synonymous with undue expenditure of public funds and inefficient service. With the growth of the country and the expansion of departmental work, these unsatisfactory conditions will increase.

It is true, as regards medical officials, that without a service in which promotion occurs and is dependent upon efficiency in medical knowledge, they degenerate, or, at least, do not keep abreast of the rapid advances made in modern medicine. The result is soon apparent in a depreciation in the standard of the service rendered the public, and, when comparisons are made with other countries where a well-organized public health service exists, the difference in efficiency is marked.

It has been found, where a medical or public health service is directed by a chief officer vested with authority to supervise the duties of each member of the staff, and where promotion is consequent upon work done, overlapping or duplication is done away with and an *esprit de corps* exists which cannot be obtained otherwise.

At the time of the initiation of the Federal departmental services of Canada, public health had not the important position it now holds. Its field, however, has gradually extended since 1867, so that to-day, much of the work now done under the departments enumerated above is covered by the term "Public Health." Such being the case, it would be proper to gather these detached portions of the service together under a deputy minister, who might, perhaps, be appropriately attached to the Department of the Secretary of State. To do this would not call for the creation of a new office, as that of Director General of Public Health now exists; and under this officer should properly be gathered the medical work above enumerated, together with that dealing with tuberculosis and now carried on by the Canadian Association for the Prevention of Tuberculosis through the aid of the annual Federal grant of ten thousand dollars.

The centre of work of this Department would be the national laboratory recommended to the Government by the Commission of

Conservation, and subsequently approved of by Order in Council. To this laboratory, officers could be detailed from time to time, to familiarize themselves with laboratory detail, and also to learn the advanced practices of public health work.

Upon a department of health would devolve the supervision of town planning, so far as it relates to those sections of the country over which the Federal Government has jurisdiction; and further, it would be charged with the enforcement of any act that may be passed in respect to the pollution of waterways.

As regards economy in administration, a considerable saving would be effected, and, at the same time, greater efficiency would result. Particularly would this apply to the medical inspection of immigrants, which would be brought in closer touch with quarantine work. In this way, the present cumbersome and inefficient method of inspection could be made what it should be, viz., practical and efficient.

Inspection of Domestic Meats

A question which should engage the immediate attention of municipal authorities and provincial legislative bodies is that of the food supply, and more particularly of good, wholesome meat. This is all the more urgent, as, under the present excellent service of the Veterinary Director General, a rigid selection, in respect to our export meat trade, is made, both of animals intended for slaughter and of the carcasses at the time of slaughter. The bulk of the meat so slaughtered is sold in foreign parts, but little being disposed of for home consumption. We thus find ourselves in Canada, in the anomalous position of enforcing laws which, when applied to their ultimate extent, militate against the highest interests of our own people in so far as they relate to a good, wholesome meat supply.

If it is in the interest of the foreign consumer that the present Dominion system of meat inspection should be carried on, how much more so should a similar system be carried on throughout the length and breadth of Canada in the interest of seven million Canadians! If the former method is right and sanitary, then our provincial laws, in so far as they relate to meat for home consumption, are wrong. What is good for the British consumer is not too good for the Canadian.

The rigid manner in which the Dominion law is enforced has resulted in the best selected cattle being slaughtered for export and those of an inferior grade alone remaining for home consumption. But these cattle are not slaughtered under inspection of any kind,

and there is sold in our country daily, meat of all kinds which could not be exported, meat that is not inspected except in an antiquated manner, that is expensive to the ratepayer because serving no useful purpose.

The remedy for this lies in the adoption of provincial laws which will empower cities and towns to adopt a system which has been in operation in some European cities for nearly a century, viz., that requiring the slaughter of animals and fowl at an abattoir where similar inspection will be carried on to that in force under the Dominion law. Such abattoirs should be owned and operated by the municipality, and where established, power should be vested in the authorities to pass by-laws prohibiting the sale within the municipality, of meat of animals or fowl, which have not been slaughtered at the municipal abattoir. In the interest of the health of the people of Canada it is necessary that action along the lines indicated, be taken at once.

Ottawa Typhoid Epidemic

During the winter of 1911, typhoid fever was epidemic in Ottawa. After having received the approval of the mayor and the city council, and of the Provincial Board of Health of Ontario, the Medical Adviser of the Commission of Conservation conducted an investigation into the causes of the epidemic. In this, he was assisted by Dr. R. W. Bell, Medical Inspector for the Ontario Board of Health; Col. Carleton Jones, and Major Lorne Drum, of the Army Medical corps. The work occupied several weeks and required the services of a number of temporary officers. The Report has been published in pamphlet form.

Bovine Tuberculosis

During the year, your Medical Adviser acted as a member of the International Commission on the Control of Bovine Tuberculosis, which has held four sessions and presented one report to the American Veterinary Medical Association.

Canadian Public Health Association

I note with pleasure the formation of the Canadian Public Health Association, which has been recently inaugurated under the direct patronage of His Royal Highness, the Governor General. The first Congress held in the city of Montreal, was attended by representatives of all parts of the Dominion, and the subjects discussed were such as to commend it to the people of the Dominion as an important factor in the spread of sanitary knowledge to all classes. Certainly, as an educational factor, the spread of information in regard to public health may be considered as pre-eminently useful.

EXPENDITURES OF FEDERAL DEPARTMENTS FOR PUBLIC HEALTH SERVICE IN 1910.*

Department of Agriculture

Quarantine:

Director General of Quarantine.	$ 4,000.00	
Halifax	9,504.53	
Louisburg	1,292.64	
North Sydney	3,880.60	
Pictou, N.S.	300.00	
Charlottetown, P.E.I.	982.83	
Chatham, N.B.	1,116.77	
St. John, N.B.	11,967.57	
Grosse Isle, Que.	59,322.63	
Prince Rupert, B.C.	2,240.10	
Vancouver, B.C.	400.00	
Victoria, B.C.	31,491.86	
Frontiers general	2,453.75	
		$128,953.28
Tracadie and Darcy Island Lazarettos	8,658.02	
Public Works Health Act	4,169.96	
Grant to Canadian Association for Prevention of Tuberculosis.	5,000.00†	
		$17,827.98

Department of Inland Revenue

Adulteration of Food:

Salaries of Laboratory Branch	$16,450.00	
Analysis Fees	2,461.65	
Food Inspection	8,513.06	
General expenses	11,188.68	
		38,613.39

Department of the Interior

Immigration Branch:

Ottawa—Dr. P. H. Bryce	3,400.00	
Halifax—Dr. A. C. Hawkins	$ 1,867.00	
Detention Hospital	9,925.12	

*From the report of the Auditor General for the year ending March, 31st, 1910.

†Since increased to an annual grant of $10,000.

Montreal Detention Hospital..	8,305.66	
North Sydney, medical officer.	1,000.00	
Prince Rupert Hospital..	1,113.64	
Quebec—Dr. Lavoie....	2,022.50	
Dr. Dobbin..	1,221.00	
Dr. Lessard...	1,221.00	
Dr. Potvin....	1,221.00	
Detention Hospital..	23,861.52	
St. John Detention Hospital...	6,583.00	
Vancouver—Dr. Monro..	1,528.00	
Victoria—Dr. Milne..	2,500.00	
Winnipeg—Dr. Corbett.... ..	1,200.00	
		$66,969.44

Department of Indian Affairs

Prince Edward Island..	846.75	
Nova Scotia....	4,955.20	
New Brunswick..	3,250.71	
Quebec..	11,025.63	
Ontario..	9,677.52	
Manitoba, Saskatchewan, Alberta and N. W. T..	60,116.88	
British Columbia, medical attendance, medicines and hospitals..	30,970.96	
Prevention of the spread of tuberculosis..	4,277.75	
		$125,121.40
		$377,485.49

Summary of Expenditure

Department of Agriculture....	$146,781.26
Department of Inland Revenue.	38,613.39
Department of the Interior...	66,969.44
Department of Indian Affairs.	125,121.40
	$377,485.49

Mr. Sifton: There is a matter connected with the Public Health branch of our work to which I wish to make reference for a moment, because I think it will come perhaps more logically here than anywhere else. After the Dominion Public Health Conference that was held last year under the auspices of this Commission, Sir Edmund Osler and myself waited upon the Government and presented the recommendations agreed on by that Conference. As you have heard, some of our recommendations were accepted by the Government and some were not. We, of course, thought they should all have been accepted, and we shall endeavour to see what we can do with the new Government in regard to the matters that the old Government did not see fit to carry out. As to one matter which the Government agreed to carry out, nothing has been done owing to the change in the Administration; that was in regard to the establishment of a National Laboratory. In order that you might have clearly in your mind exactly what the proposal was, I have asked Dr. Hodgetts to prepare a memorandum which embodies the substance of the reasons for the proposal which was made to the Government. That memorandum is as follows:

Memorandum *Re* Federal Laboratories and Biological Products

Anti-toxins, toxins and sera are now generally used for such diseases as diphtheria, typhoid fever, tetanus, rabies, epidemic cerebro-spinal meningitis and bubonic plague.

These products are not made in Canada and there is no method whereby the government can protect the people against inferior products. And to be of any preventive or remedial value, they must be of the purest quality and of a known standard. As exemplifying the danger and as a practical indication of what has actually occurred, a recent Report of the United States Bureau of Animal Industry on Anti-Tetanic Serum states that packages of this serum labelled to contain 500,000 units, actually contained only from a minimum of 472 units to a maximum of 615 units. In other words, if these packages had been used, it would, theoretically, have been necessary to use from 800 to 1,000 to obtain the results that one package was supposed to produce. At the same time, it is not possible, as a practical question, to use this large amount, nor is it possible for a doctor in ordinary practice, to determine the actual strength of such products. In addition, there is every reason to believe that as great discrepancies exist in the other products of the class. That they be of a

uniform standard, is of the highest importance, as any departure from the fixed standard makes their use impossible and seriously endangers life.

The peculiar method of manufacture of anti-toxins, sera, etc., and the absolute necessity for a certified fixed standard of quality and efficiency, together with the almost prohibitive price placed upon many of these remedies, has led to their production by the governments of several countries. Thus, the United States and Japan and the state of New York have, in the public interest, engaged in their manufacture. The result of this has been the more general use of the products for the mitigation of suffering and disease, and their being supplied at cost price, in these countries.

To meet the requirements and to put Canada in the forefront in this particular and important part of public health work, it is essential to establish central biological laboratories. They must be up-to-date in every respect, and for the carrying on of the work the best laboratory experts must be engaged.

To construct and equip laboratories for this purpose, as well as to carry on experimental and research work which is essential in all biological laboratories, would require the expenditure of not more than $50,000 for construction and equipment; and for annual maintenance the cost would be not more than $25,000. This latter expenditure would be partially offset by the sale of the products.

Mr. Sifton: In other words, these supplies which, in the modern practice of medicine, it is absolutely essential physicians should be able to procure quickly, and of proper quality, cannot be had in Canada at the present time. It is not intended to suggest that there are no such supplies, but it is intended to maintain that the supplies are inadequate and unreliable.

We represented these facts to the Government after the Dominion Health Conference and the Government promptly recognized the necessity of dealing with the question and promised to take it up and carry out our recommendations. Since the change of Administration took place, I have seen one or two members of the new Government in regard to the matter and have been assured that, if it is again brought before the Government and the reasons for the recommendation given, it will be considered favourably. I am therefore going to ask you this afternoon to endorse by resolution the action of the Dominion Public Health Conference in requesting that this National Health Laboratory be established, so that we can again send our re-

commendation to the Government and ask them to have the necessary amounts put in the estimates for the present year in order that we may have something done in the way of actually establishing the laboratory this year. I have had the memorandum prepared so as to place before you a succinct statement of the position.

We shall now have a statement of the agricultural work of the year from Mr. F. C. Nunnick.

COMMITTEE ON LANDS

Mr. Nunnick said:

I have the honour to present herewith a summary of the work undertaken by the Committee on Lands of the Commission of Conservation for the year 1911, with suggestions regarding future work.

Agricultural Survey

For 1911, the work of the Committee on Lands has been as proposed at its committee meeting held at the Second Annual Meeting in Quebec in January, 1911. One feature of the work has been the collecting of information by means of an agricultural survey of representative areas of each province, similar to that conducted in 1910. The work has been conducted in a more comprehensive manner and has been divided under four heads as follows:

1. An investigation of areas under crops; crop rotation; crops used; seed selection; varieties used; amounts seeded to clover and alfalfa; comparison of yield with that of ten and twenty years ago; the uses of manures and fertilizers, how applied, and care to prevent waste of same.

2. An investigation of weed pests, insect pests and plant diseases, with special reference to their prevalency, and the time when they were first introduced to the farm; whether increasing or decreasing; estimated loss; causes responsible for the foregoing, and the preventive measures adopted.

3. An investigation of the fuel, power and water supplies. Special attention has been paid to the length of time the fuel supply will last, to the afforestation of present waste land and the results of planting where any has been done; the motive powers for house, farm and field work; the source and location of water supply for house use and for stock, the distance from possible sources of contamination and how conveyed to the house; and conveniences in the houses for conserving human energy.

4. The scoring of the farms to ascertain instances of good farming with a view to their suitability for illustrating the system and

methods which have been most successful and profitable in the locality. Information has been obtained regarding drawbacks to the profitable continuation of any branch of the farmer's present system of farming, and the branch or branches of farming specialized in.

Twenty-two men were employed to circulate printed question schedules among the farmers. From personal observation by these men and from the testimony of the farmers, much information was obtained, which has since been tabulated ready for printing. The Agriculturist of the Commission supervised the survey work and held conferences with the field men while they were engaged in the work.

The information obtained is considered fairly representative of the actual conditions in each province in regard to the preservation of soil fertility, the inroads of weeds and insect pests and the practice of well-planned farming, as shown by systematic rotation of crops, the practice of sowing selected seeds and the application and care of manures and other fertilizers.

Alfalfa Investigation

Another feature of this year's work has been the beginning of an investigation into the conditions under which alfalfa can be successfully grown in different districts of the Province of Quebec. The Committee on Lands co-operated with Macdonald College in this work, with Prof. Klinck as supervisor.

The following is Prof. Klinck's report of the work conducted thus far:

L'Assomption County

"Of the three farms chosen in this county, two were quite heavy clay and a third clay loam. On two, the subsoil was a heavy clay; on the other, sandy to a sandy loam. Owing to the inability of one of the farmers, through sickness, to get his land into reasonably good condition, only two fields were sown. All three pieces were broken out of sod—timothy and clover mixed. As two of these fields had been down for years, the preparation of the seed bed was much more difficult than it otherwise would have been. After the hay crop had been removed, shallow ploughing, followed by frequent surface cultivation, was employed to get the land into condition. Lime was applied about the middle of July, at the rate of a ton per acre; and about a week before seeding, an application of from 12 to 15 tons of manure was made. This was ploughed in, and early in August, the land was thoroughly cultivated and harrowed until a good seed bed was obtained. The alfalfa was sown on August 7th, at the rate of 25 pounds per acre.

"When these plots were examined, on the 12th of August, the

stand was found to be good and the vigour and growth of the plants fairly satisfactory.

"The prevalence of mustard in both these fields detracted much from their appearance; but, should the alfalfa come through the winter successfully, the mustard will not interfere with subsequent crops.

"On the plots to be seeded next spring, lime has been applied and, while manure was not in all cases available for application this fall, it will be put on during the winter or early spring, so that the land intended for next year's seeding should be in good heart.

"Mr. J. A. Simard, one of our senior students at Macdonald College, who had charge of the work in L'Assomption, also selected two farms in Chicoutimi; but no attempt was made to prepare the land for seeding this summer. The necessary area has been broken up and put into as good condition as possible for sowing in 1912.

"The following men have taken up the work in L'Assomption and Chicoutimi—

E. Landry, L'Assomption.
N. Marsolais, L'Assomption.
C. A. Foisy, L'Assomption.
Jos. Tremblay, Chicoutimi.
F. Boily, Chicoutimi.

"The attitude of the community towards the undertaking was, on the whole, favourable; but, in view of the fact that alfalfa is unknown to the farmers of these districts, naturally many evinced no interest. This apparent indifference, however, will be overcome if we can demonstrate that the crop can be successfully grown. As to the ultimate outcome, there can be no question, as, during the course of our driving, we found volunteer alfalfa growing in widely-separated localities where stray plants had been introduced through the medium of clover and grass seed, and had, notwithstanding the extremely adverse conditions under which they were found growing, persisted for many years.

Huntingdon and Brome Counties

"This work was under the immediate direction of Mr. G. W. Wood, B.S.A., who has since been appointed District Representative of the Provincial Department of Agriculture for the counties of Huntingdon, Chateauguay and Beauharnois.

"Three fields were chosen in each county. In selecting these fields, it was essential that the owner show a keen interest in the work and be willing to follow the instructions given, that the fields adjoin a main public road, be in a fair state of fertility and comparatively well drained, either naturally or artificially. In addition, it was important that the fields be sufficiently free from noxious weeds and

grasses to render it possible to get them into suitable condition for late summer seeding without making the cost of preparation prohibitive.

"To meet the above requirements was not an easy task. The difficulties were further increased by the fact that all spring crops had been sown and the only available land was in meadow or in pasture. As no one cared to incur the risk of losing a fair cut of hay for an untried crop, the owners naturally, and wisely, declined to break up their fields until after haying. This made the time available for rotting the sod and killing the grass and weeds all too short to be done economically; but the following men enthusiastically took up the work and did their utmost to get their plots into as good condition as the limited time at their disposal permitted,—

In Huntingdon county	In Brome county
J. Cunningham, Huntingdon.	H. E. Williams, Knowlton.
H. S. Tannahill, Trout River.	J. A. Woodley & Son, Knowlton.
R. Pringle, Huntingdon.	J. Emerson, Sutton Junction.

"All the fields in Brome were in hay and were composed of light, loamy soil with a sandy or gravelly subsoil which afforded splendid natural drainage. In Huntingdon, one was an old alfalfa field which had been partly frozen out the previous winter. The soil was a heavy clay loam, fairly rich in humus. The second field was an old, sod-bound pasture, on rolling land, with a gravelly subsoil, while the third was a new clover meadow on heavy clay soil with a tendency to be wet at a depth of a little less than three feet.

"Plan of Illustration Plots.—From each of the above fields, a three-acre block was accurately measured. Each block was divided into three plots of an acre each. On the first plot alfalfa, without a nurse crop, was sown as early in August as the land could be put into condition. On the second plot, alfalfa will be seeded next spring with a nurse crop of beardless barley. The third plot is to be used as a check and is to be cropped the same as it would have been if no illustration work whatever was being conducted on the farm.

"Soil Sampling and Testing.—Soil samples were taken from all the plots, both from the upper layer, or upper six inches, and also from the subsoil. In order to obtain representative samples, a composite sample was made from six borings taken from different parts of the plot. At the same time the soil samples were taken, the plots were tested for acidity. In Brome county, all the soils were found to be decidedly acid, while in Huntingdon, two of the fields were slightly so.

"Method of Preparing the Soil.—As it was the middle of June before the fields were selected, the hay on the plots chosen for late summer seeding was cut as early as practicable. After removing the crop, the sod was ploughed, shallow and flat, after which it was thoroughly compacted by the roller. This "firmed" the soil so that cultivation could be begun almost immediately without danger of tearing up the sod. The first cultivations were given with the spike-toothed harrow, and, as the sod began to decompose, deeper working was given either with a disc harrow or with a spring-tooth cultivator. These cultivations were continued for about a month, at intervals of from a week to ten days, after which lime was applied, where required, and thoroughly incorporated with the soil. About the first of August, barnyard manure was applied at the rate of 15 tons per acre. A second ploughing was then given, and, notwithstanding the exceptionally dry summer, was easily accomplished, as the earlier surface cultivations had so conserved the moisture that even on the heaviest clays there was a tendency to plough too deeply. In every case, the land worked very nicely, with the exception of a few patches where couch-grass was plentiful. The plots intended for seeding next spring were broken up somewhat later in the season and similarly treated.

"Seed and Seeding.—In order to secure a hardy strain of alfalfa, seed of a variety known as "Grimm" was obtained. This strain has survived the rigorous winters of Minnesota for many years and is generally regarded as being more hardy than common alfalfa. After having secured a fine, firm seed bed, the seed, previously inoculated with nitro-culture, was sown at the rate of 25 pounds per acre. In most cases, the seed was distributed with the grass seed attachment on the ordinary grain seeder. In order to get the seed on evenly, the ground was gone over twice. The seed was, in most cases, covered by means of a spike-tooth harrow, but where the ground was very mellow the weeder did very effective work. Seeding was completed in Huntingdon during the first week of August, or about a week after the first ploughing. In Brome, it was finished the following week.

"Growth of Crop.—The soil being moist, and the weather warm, the alfalfa, in every case, germinated very quickly. By the early part of October, all the plots in Huntingdon had made a satisfactory growth. The plants were about seven inches in height, dark green in colour and gave every indication of being able to withstand the winter. In Brome, the opposite condition obtained. While germination had been prompt, the growth had been very slow and unhealthy. Sheep sorrel abounded everywhere. The causes of these

conditions have not yet been determined. It may be that sufficiently liberal applications of lime have not been made, or, what appears more probable, that the lime had not been applied sufficiently early to correct the acidity before growth began. In order to test these tentative conclusions, the plots intended for next spring's seeding have been treated with heavier applications of lime this fall.

"Previous Experience with Crops.—Scarcely any alfalfa is being grown in the counties of Huntingdon and Brome. A few farmers in Huntingdon have been fairly successful, but the number is very small. In Brome, a number of attempts have been made, but, thus far, without success, as the stand has generally been lost during the first winter. Some few experimenters have practised inoculation; the great majority have not. So far as could be learned, the acid condition of the soil had never been taken into consideration. It is quite probable that failure to comply with these two essentials have been largely responsible for the failures recorded.

"The farmers in these districts appreciate very much the opportunity that is being afforded them for co-operating with the Commission of Conservation. Without exception, every man with whom the Commission is co-operating in these counties has done his utmost to insure the success of the undertaking. The communities, as a whole, have shown unusual interest in the work and seem to appreciate the fact that, if this high yielding, nutritious plant can be grown successfully, it will not only be a boon to the farmers themselves, but a blessing to the entire community."

I beg leave to suggest for the consideration of the Committee on Lands:

1. The preparation, publication and distribution of concise and practical bulletins on such subjects as "Farm Water Supply," and "Systematic Rotation of Crops as a Means of Preserving Soil Fertility."

2. The undertaking of underdrainage illustrations where such are most needed and would prove of most benefit.

3. The extention to other provinces of the alfalfa illustration work now being conducted in the Province of Quebec.

4. The continuation for another year of the diagnosis of agricultural conditions by means of the agricultural survey work, in order to obtain further reliable data for guidance in future operations.

The following is taken from "Farm and Dairy" of December 28th, 1911:

"A new departure in the way of agricultural education will probably take place in the provinces of Ontario, Quebec and New Brunswick next spring and summer. The Canadian Pacific railway is now negotiating with the governments of these provinces with a view to having special agricultural trains tour every part of the provinces in order that demonstrations and lectures may be given to farmers with a view to improving the productive capacity of the farms.

"The system has been in operation in Western Canada for some years past and has proved so beneficial that the Canadian Pacific railway is now making the effort to extend the same benefits to the East. If the scheme is adopted, special trains with lecture and demonstration cars, and with professors from the various agricultural colleges, will spend the spring and summer going over the provinces and stopping at all the principal towns for lectures and demonstrations, to attend which farmers will be granted reduced fares in all the various districts.

"Dairy farming, fruit farming, stock raising and a good seed propaganda will all be treated from a scientific point of view and in such a way as to afford the maximum of practical help and encouragement to the farmers in every locality."

This means of extension work is meeting with excellent success in the United States.

Information and illustrations regarding the conservation of soil fertility and the improvement of the water supply and sanitary conditions on the farm, should form a part of the demonstrations and lectures. If the special train scheme be adopted, I would recommend that the Commission encourage and co-operate in this movement.

COMMITTEE ON FORESTS

Forest Fire Legislation

During 1911, a great deal of the attention of the Committee on Forests was concentrated upon the prevention of forest fires. Investigations carried on in the field, by skilled woodsmen during 1910, showed that about thirty-four per cent. of all forest fires for which causes could be assigned were due to railway locomotives. The Commission, therefore, recommended to the Dominion Government that legislation be passed penalizing the railways for forest fires set by them. The Chairman of the Commission of Conservation, the Chairman of the Railway Commission and the Hon. George P. Graham, Minister of Railways and Canals, met in conference early in the year. The result of this conference was that forest fire legislation was drafted which was subsequently passed by Parliament as an amendment to the Railway Act.*

* 1-2 George V., Chap. 22.

This new legislation empowers the Railway Commission to,—"require the company to establish and maintain an efficient and competent staff of fire-rangers, equipped with such appliances for fighting, or preventing fires from spreading, as the Board may deem proper, and to provide such rangers with proper and suitable equipment to enable them to move from place to place along the line of railway with all due speed. The Board may require the company to maintain an efficient patrol of the line of railway and other lands in the vicinity thereof to which fires may spread, and generally define the duties of the company, and the said fire-rangers, in respect thereof. The Board may require the company to make returns of the names of fire-rangers in its employ in the performance of the above duties, and of the places and areas in which they are from time to time engaged. For the purpose of fighting and extinguishing fires, the said fire-rangers may follow the fires which spread from the railway to over and upon the lands to which they may spread."

Further,—

"Whenever damage is caused to any property by a fire started by any railway locomotive, the company making use of such locomotive, whether guilty of negligence or not, shall be liable for such damage, and may be sued for the recovery of the amount of such damage in any court of competent jurisdiction: Provided that if it be shown that the company has used modern and efficient appliances, and has not otherwise been guilty of any negligence, the total amount of compensation recoverable from the company under this section in respect of any one or more claims for damage from a fire or fires started by the same locomotive and upon the same occasion, shall not exceed five thousand dollars; provided also that if there is any insurance existing on the property destroyed or damaged the total amount of damages sustained by any claimant in respect of the destruction or damage of such property shall, for the purposes of this subsection, be reduced by the amount accepted or recovered by or for the benefit of such claimant in respect of such insurance. No action shall lie against the company by reason of anything in any policy of insurance or by reason of payment of any moneys thereunder. The limitation of one year prescribed by section 306 of this Act shall run from the date of final judgment in any action brought by the assured to recover such insurance money, or, in the case of settlement, from the date of the receipt of such moneys by the assured, as the case may be.

"2. The compensation, in case the total amount recovered therefor is less than the claims established, shall be apportioned amongst the parties who suffered the loss, as the court or judge may determine.

"3. The company shall have an insurable interest in all pro-

perty upon or along its route, for which it may be held liable to compensate the owners for loss or damage by fire caused by a railway locomotive, and may procure insurance thereon in its own behalf.

"4. The Board may order, upon such terms and conditions as it deems expedient, that fire guards be established and maintained by the company along the route of its railway and upon any lands, of His Majesty or of any person, lying along such route, and, subject to the terms and conditions of any such order, the company may at all times enter into and upon any such lands for the purpose of establishing and maintaining such fire guards thereon, and freeing, from dead or dry grass, weeds and other unnecessary inflammable matter, the land between such fire guards and the line of railway."

In the enforcement of this law, the Commission of Conservation is co-operating actively with the Railway Commission, a committee composed of Hon. Clifford Sifton, Dr. B. E. Fernow and Senator W. C. Edwards, being delegated to assist Chairman Mabee in any way feasible.

Forest Reserves

In the matter of forest reserves, the Commission took an active interest during 1911. The necessity for greatly enlarging the forest reserves on the eastern slope of the Rocky mountains was strongly urged on the Government. As a result the Rocky Mountains Forest Reserve Act was passed.* The Act set aside an area of 17,900 square miles on the eastern slope, for a perpetual forest and game reserve. The old Rocky Mountains, Waterton Lakes and Jasper parks are included in the new reserve. These had a combined area of 2,953 square miles. The new Act, therefore, sets aside an additional 14,947 square miles. This reserve constitutes an important regulating influence for the water supply of the Prairie Provinces and, at the same time, it has the distinction of being the largest national park in the world.

The Committee on Forests was also engaged in collecting information regarding the forest wealth of Canada and in ascertaining the methods of forest management practised. As a foundation for all subsequent work, the forest laws of the Dominion and of the several provinces have been summarized, special attention being given to the clauses relating to forest fires. The Forester of the Commission made a close investigation of the conditions in the Porcupine district after the fire of 1911. A study has also been made

* 1-2 George V., Chap. 10.

of the progress of reforestation in Canada, and of the possibilities of municipal forest culture in Ontario and Quebec.

Mr. Sifton: I shall now call upon Mr. W. J. Dick, the Mining Engineer of the Commission, to report on the work done during the year in respect to minerals.

COMMITTEE ON MINERALS

Mr. Dick said:—

I beg to submit a brief *résumé* of my work, as Mining Engineer of the Commission of Conservation, during the year 1911.

The first half of the year was spent in preparing the report on minerals. A short time was also spent in writing a report on the water-powers of British Columbia.

Inspection of Coal Mines

During the months of June, July, August and a portion of September, the following mines were visited:

Saskatchewan—

Mines in vicinity of Estevan:

Manitoba and Saskatchewan Coal Co.
West Dominion Colliery.
Estevan Coal and Brick Co.
Bienfait Mine.

Mines in vicinity of Taber:

Canada West Coal Co.
Eureka Mining Co.

Alberta—

Mines in vicinity of Lethbridge:

Chinook Coal Mining Co.
Diamond Coal Co.
Lethbridge Collieries, Ltd.
Alberta Railway and Irrigation Co. (No. 2 and No. 6 mines.)
Royal Collieries.

Mines in vicinity of Lundbreck:

Breckenridge and Lund Coal Co.
Galbraith Coal Co.

Mines in vicinity of Edmonton:

Clover Bar Coal Co., Ltd.
Humberstone Coal Co., Ltd.
Dawson Coal Co., Ltd.

Mines in Crowsnest district:

Davenport Coal Co., Burmis.
Leitch Collieries, No. 1 South, and No. 2 North, Passburg.
Maple Leaf Mining Co., Bellevue.
Hillcrest Collieries, Ltd., Hillcrest.
Canadian Coal Consolidated Co., Frank.
West Canadian Collieries, Ltd., Blairmore Mine, Blairmore; Lille Mine, Lille; Bellevue Mine, Bellevue.
International Coal and Coke Co., Coleman.
McGillivray Creek Coal and Coke Co., near Coleman.

Banff district:

Bankhead Mines, Bankhead.

British Columbia—

Crowsnest district:

Corbin Coal and Coke Co., Corbin.
Hosmer Mines, Hosmer.
Crowsnest Pass Coal Co., Michel Mines and Coal Creek Mines.

Nicola valley:

Diamond Vale Coal Co.
Nicola Valley Coal and Coke Co.
Inland Coal Co.
Pacific Coal Co.

Vancouver Island:

Western Fuel Co., Nanaimo and Brechin.
Pacific Coast Coal Co., South Wellington.
Vancouver Nanaimo Coal Co., East Wellington.
Canadian Collieries, Ltd., Extension Mines and Union Mines.

A short visit was also made to the Kopper's by-product coke oven plant of the Algoma Steel Co., at Sault Ste. Marie, Ont.

Visits were made to the above mentioned mines to ascertain the methods of mining employed at each mine, the size of rooms and pillars, methods of drawing pillars, depth of cover over the workings and its effect on the method of mining and extraction, percentage extraction of coal, the waste of unmarketable coal (slack) and the provisions for safeguarding the workmen.

As the miners of the Crowsnest district were on strike at the time of my visit, I was unable to inspect personally some of these mines, but, in such cases, the mine managers furnished me with the necessary information. The results of this investigation will be embodied in a report which is now being prepared.

It was found that there was in Saskatchewan, Alberta and British Columbia, a considerable waste of slack coal which had been mined and brought to the surface. This waste of unmarketable slack coal varies from 10 to 35 per cent. of the output. In Saskatchewan, 10 to 25 per cent. of the output from the mines is slack coal, which is dumped on the ground and wasted. In the vicinity of Estevan, 10 to 12 per cent. of the output from some of the larger mines is dumped on the prairie and burned. It is necessary to remove this coal (lignite) from the mine plant as it readily ignites by spontaneous combustion.

The waste of slack coal varies from 10 to 12 per cent. in the Lethbridge district, and from 20 to 35 per cent. in the Edmonton district. In the Crowsnest Pass district in Alberta and British Columbia, the coal is of better grade and some of the slack is marketable; the remainder is made into coke in beehive coke ovens. At Bankhead, briquettes are made from the slack coal. On Vancouver island, some of the large producing mines waste from 10 to 15 per cent. of their output as slack coal, and, unfortunately, it is generally dumped into the sea (see photos). The high freight rates make it impossible to market this slack at a profit. In this *résumé*, it is impossible to do more than suggest what might be done in order to save to the community what amounts to more than 15 per cent. of the total output of coal, although this figure would be increased very considerably if the low-grade coal left in the mine were also considered.

The following are some points to which attention could be profitably directed:

1. To ascertain the price of coal in different parts of the West, and which portions of the country are supplied with coal from the different mining centres, also to determine to what extent the Canadian market is invaded by American coal, it is necessary that a study be made of the prices of coal in Canada and the freight rates on the

WASTE OF LOW GRADE COAL AT TIDEWATER, BOAT HARBOUR, VANCOUVER I.

same from the mines to the market. After this information has been obtained, a map can be prepared showing graphically the distribution of the coal from the different Canadian and American mines, and the prices at the principal points of consumption.

2. Owing to the necessity of obtaining a suitable domestic fuel and cheap power for the Prairie provinces, it is desirable that investigations be carried on with a view to utilizing the lignites which underlie the greater portion of these provinces. In this connection, it is of interest to know that the United States Bureau of Mines has demonstrated that suitable briquettes can be made from low-grade lignites. The magnitude of the briquette industry in Germany and the part it plays in utilizing the lignite or brown-coal deposits of that country are shown by the fact that, in 1910, the German Empire produced 21,575,000 short tons of briquettes, of which 16,675,000 tons —77 per cent. of the total—were made from lignite.

The following is quoted from Bulletin No. 14 of the United States Bureau of Mines, page 10:

"Enough testing has been done to indicate that some American lignites equal German lignites in fuel value and can probably be made into briquettes on a commercial scale without the use of binding materials. Three samples of lignite, one from Texas, one from North Dakota, and one from California were made into satisfactory briquettes without the addition of a binder. It was proved that some lignites after having slacked by exposure, can be made into briquettes without the use of binding material, notwithstanding a general opinion that this could not be done. Cohesion and weathering tests demonstrated that good briquettes endure handling and resist weathering much better than the lignite from which they are made."

With regard to the production of cheap power, the following extract is taken from Bulletin No. 13, United States Bureau of Mines, page 10:

"These tests in the gas producer have shown that many fuels of such low grade as to be practically valueless for steaming purposes, including slack coal, bone coal, and lignite, may be economically converted into producer gas and may thus generate sufficient power to render them of high commercial value.

"Practically every shipment tested in the producers including coals with ash as high as 44 per cent. and lignites and peats high in moisture, has been successfully converted into gas that has been used in operating gas engines. It is estimated that on an average each coal tested in the producer-gas plant developed two and one-half times the power that it would develop if used in the ordinary steam-boiler plant. Such relative efficiencies probably hold good for

the average installation of moderate power capacity, but the ratio is smaller when large steam plants of the most modern type are compared. It was found that the low-grade lignite of North Dakota developed as much power when converted into producer gas as did the best West Virginia bituminous coal when utilized under the steam boiler. Thus, through these investigations lignite beds underlying 20,000,000 to 30,000,000 acres of public lands, supposed to be worth little, have been shown to possess a large value for power development. As a result the money value of this Government land has been increased to the extent of probably $300,000,000 or more.

"Investigations into this waste of coal in mining have shown that it probably aggregates 250,000,000 to 300,000,000 tons yearly, of which at least one-half might be saved. It has been demonstrated that the low-grade coals, high in sulphur and ash, now left underground, can be used economically in the gas producer for the ultimate production of power, heat and light, and should, therefore, be mined at the same time as the high grade coal. Moreover, attention is now being called to the practicability of further reducing this waste through more efficient mining methods."

It was noticed that all the coke produced in Alberta and British Columbia was made in beehive ovens, the by-products—gas, tar and ammonia—being wasted. The only redeeming feature in this practice is that the coke is made from what might otherwise be waste slack coal. On the other hand, the coking of coal in by-product ovens should be encouraged in every way. The tar recovered in this way could be used as a binder in the manufacture of briquettes. During March, 1911, the Bankhead Mines, Ltd., Alberta, used nearly 1,000 tons of tar in their briquetting plant. It was obtained as a by-product from the coke ovens at Sault Ste. Marie, Ont., and cost $17.50 per ton delivered at Bankhead.

Recommendations

I desire to repeat several recommendations, made in the recently published report on Minerals, that refer to certain advised legislative enactments which are necessary in order to prevent the waste of some of our valuable mineral resources, and to further safeguard human life.

The recommendations are as follow:

1. It is advised that the Dominion regulations, relating to the disposal of petroleum and natural gas rights in the provinces of Manitoba, Saskatchewan, Alberta and the Northwest Territories make provision for the plugging of all abandoned natural gas wells, and that a severe penalty be imposed for wilfully allowing gas to waste.

WASTE OF SLACK COAL AT TIDEWATER, LADYSMITH, VANCOUVER I.

NATURAL GAS FROM BORING FOR OIL MADE BY THE DOMINION GOVERNMENT AT PELICAN PORTAGE, ATHABASKA RIVER, ALTA.—BURNING SINCE 1897

2. Records of all drill holes (diamond, keystone calyx, etc.) should be filed with the Government.

3. The plans of the workings of all abandoned mines should be filed with the Government.

4. Owing to the high death rate in coal and metal mines, it is advised that a Royal Commission be appointed to investigate mine accidents in Canada.

1. Plugging of Gas Wells.—In the past, enormous quantities of natural gas have been wasted both in Eastern and Western Canada. In a gas-field, a careless driller may either lose control of the well through carelessness or ignorance, or abandon the same without plugging it. Not only is his own property destroyed, but the surrounding area is also drained, thus injuring the entire community through the acts of a single individual. His acts thus become a matter of public concern and a proper field for legislative control.

The Province of Ontario has reduced the waste of natural gas to a minimum by causing all abandoned wells to be plugged* and by levying a tax of two cents per thousand feet, with a rebate of 90 per cent., when the gas is used.†

The photo‡ shows a burning gas well at Pelican portage, Alberta. This well has been burning and wasting gas for the last thirteen years. Although there is, at present, no market for this gas the photograph demonstrates the possibilities of waste under existing laws. No one can doubt that, in the near future, there will be an enormous market for this valuable mineral resource.

Large quantities of gas, with oil, have been "struck" in New Brunswick and it is advised that this Province make statutory provisions in order to prevent any waste of gas that may arise incident to oil production. The laws should also provide for the plugging of all abandoned wells.

2. Recording of Drill Holes.—Records of all the holes drilled in the West should be filed with the Government in order to protect future coal mining operations. If holes are drilled through coal measures in order to reach the oil or gas zone below and, after finding natural gas, the casing is withdrawn and the well abandoned, the gas "feeders" will be of great danger in future coal mining opera-

*Statutes of Ontario, Chap. 47, 1907.
†Statutes of Ontario, Chap. 9, Part II, 1907.
‡This photograph was taken by Mr. Denis, Hydro-electric Engineer of the Commission, in August, 1911.

tions unless accurate records are kept. As an instance of this, two very serious mining accidents occurred in the United States during the year 1909, on account of the workings breaking through into natural gas boreholes.

When one considers that one volume of methane mixed with seventeen volumes of air is inflammable, it can be seen that it requires but a small addition of natural gas to the mine air in order to make the mine unsafe.

3. Filing of Plans of Abandoned Mines.—In industries like copper mining, where the term "ore" has rapidly changed its meaning within the last decade—where, in other words, ore containing one, two or three per cent. of copper can now be mined profitably where it was formerly considered waste—it is clear that large bodies must be left now, which, later, may possibly be extracted with profit. This also applies to other ores mined under unfavourable conditions. On the betterment of conditions, ore left in the mine as too low-grade to extract, may eventually be recovered, provided the mine does not go to wreck in the meantime, and provided that sufficient records of the old workings have been kept. The Dominion and Provincial governments could do much to ensure the keeping of records by making it compulsory for the owner of each mine, at the time of its abandonment, to file an accurate plan on a suitable scale, showing the boundaries of the workings up to the time of abandonment, together with an assay plan showing the position and value of any low-grade ore left in the mine. This would not be too much to ask from the owners, as all well-managed mines possess this information. Such plans would not only throw more light on the geological features of the region, but would be of great use in re-opening an old mine. They would, also, safeguard an adjoining mine from breaking through into the old workings, thereby endangering life and property by the inflow of water and the fall of ground. This rule is embodied in some coal and metal mine regulations and should be extended to cover all metal mines.

4. Mine Accidents in Canada.—The statistics compiled in the report on Minerals, shows that the death rates per 1,000 men employed in the coal mines of Canada and the United States are greater than in any other country in the world for which accurate statistics are available.

To quote from the above mentioned report:

"The diagram also shows that fatalities in the United States

and Canada are on the increase, while Great Britain, Belgium and France show a gradual decrease. We must interpret this in this way: (1) The danger inherent in the work can never be eliminated, but could be brought down to a minimum, as indicated by the low, constant death rate in Belgium, Great Britain and France (excepting the year 1906); (2) Coal mine explosions occur very frequently in Canada and the United States, while they are more infrequent in other countries. The causes for this loss of life are complex and neither the operators nor the miners willingly submit to them. It is not reasonable to expect that the loss of life and property can be entirely done away with; but at the same time, experience has abundantly proven that careful and impartial investigations of such conditions will point the way to the remedying of at least some of the abuses. In view of the importance of the subject to the country and the public at large, such studies should be undertaken."

With regard to metal mine accidents, statistics show that with the exception of the Kimberley diamond mines and the Transvaal, where native and Chinese labour are employed, the fatality rate during 1900-1909 was considerably lower elsewhere than in Canada. From the foregoing it can be seen that it requires no discussion to emphasize the importance of an inquiry into the whole subject of fatal accidents in the coal and metal mines of Canada.

Mr. Sifton: There is one feature of the work in this department to which I wish to make special reference, although it is not the work of our own mining branch but of the Mines Branch of the Department of Mines. I refer to the development of peat fuel and the result of the work which has been done by the Mines Branch. I have a special reason for bringing it before you, because I wish to have the matter debated and, if possible, to have a resolution passed upon the subject before we adjourn.

Peat Fuel

One of the most important questions we have in Canada, at least in the Province of Ontario and in the Prairie Provinces, is the question of fuel, and I think I am quite safe in saying that the people of Canada do not begin to realize the importance of that question at the present time. We have not, so far, made any really serious attempt at economies in fuel. What Mr. Dick has read in regard to the briquetting of inferior qualities

of coal is a subject to which practically no attention has been paid in Canada, but which, in itself, affords a very great field of economy in the use of fuel and widens the scope of production by enabling mining to be more economically carried on.

But that does not apply to the Province of Ontario in such a way as to be of any practical help. I do not think the people of the Province of Ontario realize to what extent they are dependent upon the outside world for actual existence in the cold weather. I notice that Mr. W. K. McNaught, a member of the Ontario Hydro-Electric Power Commission, has issued a very good statement on the subject calling attention to the position, and I do not think he at all exaggerates the importance of dealing with it, especially in this Province.

There is no possible source from which cheap fuel can be procured to take the place of what is now being used which, in any respect, compares with peat. Ontario has an enormous area of peat bogs. The trouble heretofore has been that, until a very short time ago, the method of treatment was not economically successful; and it does not appear to be realized that, at the present time, that difficulty has been overcome and that an economically successful method of treating peat is now in existence and has been practically demonstrated within a few miles of Ottawa within the last two years. So, it is now a fact that, economically and commercially, the immense peat bogs of the Province of Ontario are available for fuel if a very small amount of commercial enterprise is used in connection with the subject.

I am bringing this matter before you especially because of its great economic importance and because of the fact that I think the movement requires a little support at our hands. It quite frequently happens that in important branches of work of this kind you get to the point of doing very valuable work when, for some reason or other, you are shut off. There is obviously some little movement being made at the present time to shut off the activity in the development of peat fuel, and I think this is a proper case for the Commission of Conservation to exert what little influence it may have, to declare its position on this question and to use its influence on the Government to induce them to carry on this important work.

I will read you a short memorandum on the results of the work at Alfred, which I asked the Director of the Mines Branch of the Department of Mines to give me.

The Establishment of a Peat Industry for Canada

The absence of coal in the central provinces of Canada and the necessity of importing fuel from outside sources to these provinces are conditions, which, under certain circumstances, may lead to alarming results. We at present import what we need from year to year and no provision is made for a store of fuel to tide the country over a possible stoppage of supply. It seemed, therefore, a matter of grave importance to endeavour to utilize our own fuel assets residing in the abundance and excellence of our peat bogs.

As, however, many trials have been made in Canada and much money lost in desultory, ill-considered experimentation, it was thought advisable to send a member of the staff to Europe to investigate the processes in successful operation in the peat-producing countries, and thus furnish Canadians with information regarding what is being done in Europe, and thereby prevent expenditure of money on processes which have long ago proved to be failures.

A full and detailed report of this investigation, entitled "Peat and Lignite, their Manufacture and Uses in Europe," was issued.

Mere reports and reading matter, however, are incapable of producing the conviction necessary for the commercial exploitation of a process; it needed demonstration. It was, therefore, recommended that a type of plant, of which thirteen hundred are in successful operation in Russia and a large number in Sweden, be imported, a part of a bog purchased, and the manufacture demonstrated.

It was the aim of the Director:

First—To investigate the peat resources of Canada as to the depth, quality and suitability of the individual peat bogs for fuel and other purposes.

Second—To demonstrate the process by actual operation.

Third to demonstrate the economy effected in the production of power in gas producers adapted to the use of peat as fuel.

Fourth—To interest capital in the further development of the peat industry.

Fifth—To create a market for peat.

During the seasons 1908-9-10-11, 34,242 acres of peat bogs were investigated, mapped and reported upon, and several thousand acres inspected. During the two seasons the plant has been in operation, 3,000 tons of peat fuel were manufactured, and the plant has been visited and inspected by many parties. Peat has been sold to many customers and the Canadian Peat Society has gathered opinions from the users regarding the value of air-dried machine peat as a fuel for

general purposes. These opinions have been printed by the Canadian Peat Society in a Bulletin issued by that Society, pages 10-23. A demand for this class of fuel has thus been created, and parties desirous of entering this field of manufacture will have a market awaiting them.

A commercial peat gas power plant of 60 horse-power capacity was erected in Ottawa and the tests carried out with this plant have demonstrated that with a power plant situated at or near peat bogs power can be developed at a much lower cost than with coal and that such a plant offers no difficulties in its operations.

Lastly, a company has been formed, which has carefully examined, with their own engineers, the process employed at the Government plant at Alfred, Ont., measured the excavations, assured themselves of the output, questioned the workmen, and they have come to the conclusion that this process is the only practical one at present. In consequence of this examination by Mr. Shuttleworth and his engineers, the Department has been petitioned to permit the Company to set up next spring on our bog, a plant in which the hand labour of our plant will be replaced by machinery and power. This has been granted them, the order for the machinery to be employed has been given and it is, therefore, fully expected that in April next a plant of 10,000 to 15,000 tons' capacity will be in operation.

The results aimed at by the Mines Branch have, therefore, been reached.

Mr. Sifton (continuing): So that the result of this work has been that, almost without any doubt, in a short time there will be for the first time in Canada, a commercial peat-producing plant in operation which will be able to produce peat fuel at a rate which will be a great relief to the average poor consumer in the city of Ottawa.

I do not think there will be any difference of opinion amongst us as to the desirability of our supporting the efforts made in this way, and it was in order to make that clear that I have made these remarks.

We shall now hear from Mr. M. J. Patton, the Assistant Secretary, on the subject of Fisheries and Game.

Committee on Fisheries, Game and Fur-bearing Animals

Mr. Patton said:

The principal part of the work done on behalf of this Committee consisted in the preparation of the material on fisheries and game appearing in the report entitled *Lands, Fisheries, Game and Minerals,*

1911. The main subjects dealt with in this were: jurisdiction over fisheries, Dominion and Provincial laws and regulations, the North Atlantic fisheries dispute, the Canadian oyster industry, white-fish in the Great lakes, fish culture, fisheries of Prince Edward Island, Manitoba and British Columbia, game of Prince Edward Island, Nova Scotia, Quebec and British Columbia, game fisheries of Quebec, game laws of Saskatchewan and statistics of fish production and revenue. A pamphlet on *Animal Sanctuaries in Labrador* by Lt.-Col. William Wood was also published.

The pressing need of the Committee is a well-informed and energetic chairman. From the beginning the work has been without direction from the Committee, and the drafting of the programme, as well as the execution of it, has been left to officials of the Commission who, on account of other duties, could give but a part of their time to the work. The position of chairman is now vacant.

First-hand Investigations

The information that has been collected by these officials has been gathered almost entirely from documentary sources. While a great deal of basic information can, and must, be gathered from such sources, yet, in dealing with concrete fishery problems, it is necessary that the investigator study the problem at first hand on the spot. This means the spending of more money, but it is only by adopting such a method that one can speak with confidence on the subject one investigates.

Provincial Fish and Game Resources

I would recommend that we secure articles, for the coming year, on the fish and game resources of those provinces not dealt with in our last report; that is to say, articles on the inland fisheries of Nova Scotia, New Brunswick, Ontario, Saskatchewan, Alberta and on the game resources of New Brunswick, Ontario, Manitoba, Saskatchewan and Alberta. These subjects could be dealt with best, and at a minimum cost, by provincial officials or local authorities.

Oyster Fishery

It is encouraging to learn that the Dominion Government has entered into negotiations with the Maritime Provinces with a view to placing the oyster fishery entirely under Dominion control. The policy pursued by the Government is, in all important details, in accord with that outlined in my report last year on *The Canadian Oyster Industry.* It should be noted however, that in the proposed administration of the oyster beds no limit is placed upon the area that may be leased by one individual or

corporation. It would not be well to have this important resource monopolized in Canada as it has been in the United States by the Oyster Trust.

The agreement seems to be a fair one to the provinces interested. It does not presume to effect a permanent settlement of the question and is therefore quite properly termed a *modus vivendi*—a temporary provision in the best interests of the fishery until a final and permanent settlement is reached. The main feature of it is that the Dominion Government shall take over the administration of the oyster-beds, leasing them to private individuals for oyster-farming purposes and turning over to the provinces concerned one-half of the net proceeds of the rentals.

It is understood that all the Maritime Provinces, except Prince Edward Island, have agreed to accept the proposals of the Dominion Government for taking over the administration of the fishery. Prince Edward Island is one of the principal oyster-producing provinces and I believe the Commission should do its utmost to persuade it to accept the terms that have been proposed.

Shad Fishery

In view of the very low condition of the shad industry, a brief report on that subject is being prepared.* The material for this is being taken largely from the Report of the Dominion Shad Fishery Commission of 1910. This report was never acted upon by the Dominion Government.

Fur Farming

In the past few years the price of furs has risen to an almost prohibitive level. The raising of fur-bearing animals (such for example, as foxes) has been engaged in most successfully in Prince Edward Island and in Western Ontario, though on a small scale. It is suggested that these fur farms be "written up" by the officials of the Commission in a well-illustrated pamphlet, in the hope that more persons will be induced to engage in the business.

Defective Statistics

The statistical information published by the various Governments has been found to be both incomplete and, in many cases, unreliable. Too much stress seems to be laid upon the value of fish taken rather than the quantity or weight. Such a course often gives a very misleading idea of the

*The catch of shad has fallen from 10,707 bbls. in 1899 to 5,242 bbls. in 1910, a decrease of over 50 per cent. in eleven years.

YORK BOAT, LESSER SLAVE RIVER, ALTA.

condition of the supply. I would suggest that a resolution be passed drawing the attention of both the Dominion and the Provincial authorities to the unsatisfactory nature of the statistics published.

Mr. Sifton: Mr. Denis will now report what has been done by the Commission during the past year with regard to water-powers in the Prairie Provinces.

COMMITTEE ON WATERS AND WATER-POWERS

Mr. Denis said:

I beg to submit the following report on the work done during the past year.

The greater portion of the year was spent on the preparation of the report on the *Water-powers of Canada*. The work in connection with this included the tabulation and summarizing of information obtained by correspondence, procuring and re-arranging in convenient form information from departmental and other reports, revision of proofs and other minor details attending the publication of a report. From time to time throughout the year the Commission was asked to investigate, or give information regarding certain power development propositions. Among these were the proposed power developments on the St. Lawrence below lake St. Francis, which were investigated and reported upon at the end of April. Some time was also spent in summarizing and putting in convenient form, the data respecting the water-works systems of the Dominion. This data had previously been received by correspondence.

Western Water-powers

In accordance with instructions, I left Ottawa on August 2nd, and proceeded to Winnipeg where I obtained information from the Hudson's Bay Company regarding their transport on the Athabaska river. On August 10th, I left Athabaska Landing and started by canoe on a trip down the river to make measurements of the various rapids. I reached Fort McMurray on the 14th, and, the next day, started back up the river. We "tracked" by canoe, as far as the Pelican portage, which was reached on August 21st. Here a steamboat was waiting for the Hudson's Bay Company's scows, which arrived next day. I travelled the rest of the way on board the steamboat, arriving at Athabaska Landing on August 25th.

On August 26th, I started for Peace River Landing by way of Lesser Slave lake. Peace River Landing was reached September

2nd. I measured the discharge of Peace river and of North Heart river here, thence proceeded up the Smoky river and measured its discharge at a point about two miles from the month. The return journey from Peace River Landing was commenced on September 7th, and Athabaska Landing was reached on the 17th. At the latter place, I took the discharge of the Athabaska river. On my return to Edmonton, I obtained valuable information from Mr. F. G. Goodspeed, the district engineer of the Public Works Department, and from the city officials. I also took the discharge of the North Saskatchewan river here.

From Edmonton I went to Saskatoon and measured the discharge of the South Saskatchewan. I then went to Prince Albert and gauged the discharge of the North Saskatchewan river. At the latter place, I met Mr. L. R. Voligny, district engineer of the Public Works Department, who had just returned from his summer's work during which he had completed a precise levelling of the Saskatchewan river from Prince Albert to 'The Pas.' This levelling is now being reduced, and, as soon as available, will afford us data from which we can obtain the position and descent of the rapids comprised in the survey.

Leaving Prince Albert on September 28th, I went to 'The Pas,' intending to measure the discharge of the Saskatchewan river at that point. However, as Mr. Wm. Cross of the Public Works Department was just completing a set of observations for the same purpose, I obtained his figures and worked out the discharge. I left 'The Pas' on September 30th, and returned to Ottawa by way of Toronto, where I obtained data on precipitation and temperature from the Meteorological office.

The following is a summary of some of the observations during the trip:

Rapids of the Athabaska River

The difference of levels in the various rapids was obtained by means of aneroid readings. In most cases readings were taken on the way down and checked when going up the river. At the time these observations were taken (August 11th to 21st), the stage of the river was unusually high for the season of the year. The highest water in this river usually occurs in June or July and is about six feet higher than the stage at which the observations were taken. The lowest stage occurs at the end of April or beginning of May and is about four feet lower than the stage at which the observations were taken. The sudden fluctuations to which this river is subject can be appreciated

THE CASCADES. ATHABASKA RIVER. ALTA.

from the fact that, during one night, August 23-24, its level rose some six feet, coming up almost to the high-water mark. This, of course, is not a usual occurrence, and was likely caused either by excessive rains near the head-waters or by melting snow in the mountains, as it was afterwards ascertained that similar rises had been observed in the Smoky river about the same date, and in the North Saskatchewan river at Prince Albert on August 28th.

The rapids of the Athabaska river are long and have relatively low heads. These conditions naturally imply that the large fluctuation in the flow of the river will materially affect the working heads when developed. Similar conditions occur in some of the rapids of the Saskatchewan river, where the difficulty is overcome by providing each unit with an auxiliary turbine which can be coupled to the shaft when the head is low and there is an abundance of water, or thrown out of use when the flow of the river decreases and the head becomes normal. The problem may be solved in a similar manner when the rapids of the Athabaska are developed.

The various rapids may be described as follows:

Moberly Rapid is practically insignificant, the descent being only two or three feet in a quarter of a mile.

Mountain Rapid is some seven miles above Fort McMurray and has a descent of 8 feet in about one mile. Half way between the latter and Cascade rapid is a series of rapids or swift water extending over a distance of four miles with a total descent of 15 feet.

Cascade Rapid is situated nine and a half miles above the Mountain rapids and has a descent of 7 feet in one mile.

Little Cascade Rapid is two miles above the Cascade rapid and has a decent of 10 feet in two miles, which includes a stretch of swift water and a succession of rapids.

Rock Rapid is three miles above the latter and is one and a half miles long with a descent of 12 feet.

Crooked Rapid, the foot of which is one mile above the head of the Rock rapid, is also about one and a half miles long and has a descent of 13 feet.

Long Rapid is situated some seven miles above the Crooked rapid. It is three miles long with a total descent of 28 feet.

Middle Rapid is three miles above the Long rapid and has a descent of 20 feet in one and a half miles.

Boiler Rapid is three miles above the Middle rapid and has a descent of 25 feet in three miles.

Brule Rapid is situated some seventeen miles above the Boiler rapid. It has a descent of 8 feet in a little over half a mile.

Between Brule rapid and the Grand rapid there are two other rapids not shown on the Geological Survey map. One of these at Point Brule has a descent of 10 feet in two miles; the other is about two and a half miles above and has a descent of 10 feet in one mile.

Grand Rapid is by far the most important rapid of the Athabaska river, particularly from a water-power standpoint. It is a hundred and fifty miles distant from Athabaska Landing along the river but only about a hundred and ten miles in a straight line. The river at this point is divided into two channels by an island, the difference of elevation of the water being observed as 32 feet from one end of the island to the other, a distance of 2,200 feet. But this only includes the main rapid, below which are two and a half miles of rapids and swift water sometimes called the "Little Grand" rapid, with a total descent of 10 feet. Above the head of the main rapid is another rapid, about half a mile long, with a descent of 12 feet. So that the total descent at the Grand rapid including the rapids above and below, is some 54 feet over a distance of less than three and a half miles.

Joli Fou Rapid, twenty miles above the Grand rapid, as indicated on the Geological Survey map, seems to be made up of what are now known as the Driftwood, the Major and the Wheel rapids. Individually, these are of little importance, the Driftwood having a descent of two or three feet in a quarter of a mile, the Major, a descent of six feet in half a mile, and the Wheel, three feet in half a mile.

Rapid, seven miles below Stony rapid, has a descent of 8 feet in one mile.

Stony Rapid, thirty-seven miles above Grand rapid, has a descent of 5 feet in one-third of a mile.

Pelican Rapid, the head of which is about three-quarters of a mile below the Pelican river, or forty-one miles above the Grand rapid, has a descent of 12 feet in two miles. Just above this is another small rapid or stretch of swift water, the foot of which is at the mouth of the Pelican river, with a descent of 5 feet in half a mile.

Between Athabaska Landing and the mouth of Lesser Slave river there is only one rapid of any importance. This is situated at a point, seven miles below the mouth of the Lesser Slave river, where the Athabaska is divided into two channels by a good sized island. The descent in this rapid is 10 feet in three-eighths of a mile.

GRAND RAPID, ATHABASKA RIVER, ALTA.

The Lesser Slave river, from its mouth to a point nineteen miles along its course, or sixteen miles over land, is very sinuous and is nothing but a series of small rapids, the total descent of which is some 80 feet.*

OBSERVED DISCHARGES OF RIVERS

Name of River and Point of Observation	Date, 1911	Discharge in c.f.s.	Remarks
Peace River:			
Peace River Landing . . .	Sept. 4th	59,922	
Smoky River:			
2 m. above mouth	Sept. 6th	13,344	
North Heart River:			
At mouth	Sept. 6th	44	
Athabaska River:			
Athabaska Landing . . .	Sept. 18th	28,783	
North Saskatchewan River:			
Edmonton	Sept. 23rd	11,783	
Prince Albert	Sept. 27th	12,576†	
South Saskatchewan River:			
Saskatoon	Sept. 15th	36,358	Observations taken in connection with the hydro-electric development for Saskatoon
Saskatoon	Sept. 23rd	24,508	
Saskatoon	Sept. 25th	21,378†	
Saskatchewan River:			
'The Pas'	Sept. 29th	26,684	Discharges computed from observations taken by Wm. Cross for Dept. of Public Works.
Carrot River:			
At mouth	Sept. 28th	1,237	
Pas River:			
At mouth	Sept. 27th	702	

NOTE.—The fact that the sum of the discharges of the Saskatchewan rivers on Sept. 25th and 27th is more than the discharge at 'The Pas' on Sept. 29th may be explained by the fact that the flow was rapidly decreasing from day to day, as shown by a difference of over 3,000 c.f.s. in two days for the South Saskatchewan river alone.

Gauging Stations Needed

With reference to what can be accomplished during the coming year, I would say that a matter requiring immediate attention is the establishment of gauging stations on various streams throughout the country. For the present, of course, it would be out of the question to have these stations on all streams, but a beginning might be made on the more accessible

*Information obtained from F. G. Goodspeed, District Engineer, Department of Public Works.

ones, or on those where storage and conservation will become a necessity or a natural outcome, at some time in the near future.

At the present time, there are very few streams in Canada on which artificial storage or conservation is being practised, probably because it has not yet become commercially economical or necessary to do so. When the power possibilities of a stream under natural flow have been exhausted at one site, other sites on the same or other streams have been developed, the power thus obtained supplementing the first development. Additional power can often be thus obtained at a lower cost per horse-power than by the construction of dams or reservoirs, to conserve the flow of the stream. But this cannot go on forever, and a time will come when the last site within an economical radius will have been secured and conservation of the stream will have to be resorted to in order to satisfy the increasing demand for power. When this time comes, to develop intelligently a conservation scheme on any stream, it will be necessary to possess a complete history of its flow for a period of at least ten to fifteen years, and unless the gauging has been carried on, the available data will be very meagre, and the scheme will have to be designed in a more or less haphazard manner.

Apart from the very thorough work being conducted by the Ottawa River Storage branch of the Department of Public Works, very little in the way of systematic observation of stream flow is being done in the Dominion. The Forestry branch of the Department of the Interior has been gauging streams in southern Alberta and Saskatchewan but, as the work is being pursued in connection with irrigation, the reports do not contain any figures for the winter season, which additional data would increase their value from a water-power standpoint.

Other countries, with possibly less water-power possibilities than Canada, have devoted a great deal of attention to such observations. The following table shows how long this work has been in progress in the different countries enumerated:*

Italy	since 1890
Switzerland	since 1895
Bavaria	since 1898
France	since 1903

In 1896, the United States Geological Survey began the publication of tables on "River Heights" and have since published progress reports on stream measurements. In a report on *Stream Flow*

*See *Grandes Forces Hydrauliques* (France), Vol. 1, 1905, pp. 1 and 115 to 125.

†See United States Water Supply Paper No. 11, p. 7.

*during the Frozen Season** Nessrs. H. K. Barrows and R. E. Horton say, in part:

"There is not even an approximate relation between the snowfall and the stream flow, so that the failure to obtain winter records of flow at a gauging station means a considerable percentage of uncertainty as to the total run-off as well as its distribution. In the Northern States droughts are apt to occur in the late summer or fall and during the winter. At times this condition of drought may be nearly or quite continuous between these two periods, with its culmination in January or February. If there is no melting of snow during the winter, the inflow to streams that freeze is chiefly derived from springs, ground water and lake storage, and in a long, cold winter, especially if it succeeds a period of low water, the minimum flow for the year may be reached and continue for some time. Estimates of flow, therefore, to be of conclusive value on streams utilized for water-power, must embrace these winter periods of low water."

It is needless to add that the winter conditions which occur in the rivers of the Northern States are found in even a more marked degree in Canadian rivers, and it follows that the statement just quoted applies with proportionately greater force to Canada.

It may not be within the province of the Commission actually to conduct work on systematic stream-flow observations, but it should at least endeavour to have this work started by a co-operation of the Federal and Provincial authorities by pointing out to them its immediate necessity.

Tower Survey of Canada

Another matter requiring our attention is the study of the power conditions in the different parts of the Dominion. This should include what may be termed a "power survey" of the Dominion, showing the amount or proportion of the different kinds of power—steam, water-power, electricity and gas—used in different localities, with costs and other particulars which may be of interest.

This "power survey" could be compiled partly from information in the hands of the Census and Statistics Branch and could be supplemented by correspondence where the information is incomplete. It would prove most interesting data in ascertaining the value of water-power in different localities and determining how other kinds of power could be beneficially replaced by water-power. It was recently stated by the Public Policy Committee of the American Institute of Electrical Engineers in a hearing before the United States National Waterways Commission, that, "Practically all water-powers come to birth or not, on the answer to the question,

* See United States Water Supply Paper No. 187, p. 5.

What is steam power in the territory costing?" Although this may be a rather restricted view of the question, it is nevertheless true that thorough knowledge of other power conditions is necessary in order to form a proper and intelligent conception of the facts connected with water-power development.

It might also be well to obtain all possible information regarding water-power sites which are owned by private individuals or corporations but are not being developed, investigate them and ascertain the reasons for their non-development. There are a number of cases of this kind in the different provinces where, for instance, the title to the water-power has been obtained for practically nothing as forming a part of land purchased years ago, and where the owner never has had, and possibly never will have, any intention of developing, but is simply holding it for speculative purposes. The case may be further aggravated if the power in question forms a part of a large development scheme which may be discouraged or prevented by the contrary disposition of such an owner. A case of this kind came to my notice in the Province of Quebec, where a hydro-electric plant, installed on one side of a river, was forced to operate under a head that could have been increased and to operate with only a part of the available flow of water, just because the owner of the site on the other side of the river, although he was not using any of the power to which he had a right, would not come to any agreement for combining both sites and developing them to their full capacity.

Mr. Sifton: We shall now hear from Mr. Arthur V. White on the subject of water-powers in British Columbia.

Mr. Arthur V. White said:

Water-Powers of British Columbia

In 1909, the Committee on Waters and Water-powers had commenced work upon the report which has recently been issued, entitled *The Water-Powers of Canada*. Though the existent information respecting the water-powers of Manitoba, Saskatchewan, Alberta and British Columbia was too meagre to permit of the publication of a statement that would adequately represent the water-powers of these provinces, it was obvious that it would not be expedient to withhold from early publication, the water-power data for the older settled portions of Canada until such time as more complete data for the Western Provinces were procured. Consequently, it was decided to secure by special examination in the field, and by other means, information respecting the water-powers of the Prairie Pro-

ELK RIVER CANON, EAST KOOTENAY, B.C., INDICATING WATER-POWER DEVELOPMENT POSSIBILITIES OF SOME BRITISH COLUMBIA RIVERS

vinces and of British Columbia; and then, later, to publish a report dealing with the water-powers of Western Canada.

In August, 1911, a start was made upon the special investigation of the water-powers of British Columbia. This work was placed under my charge on the completion of my portion of the work incident to the preparation of the report on the *Water-Powers of Canada.*

Early in August, I attended the Western Irrigation Convention, held at Calgary. After the meeting I proceeded to Victoria, B.C., and had interviews with the Premier, Hon. Richard McBride, and Hon. W. R. Ross, Minister of Lands. The objects of the Commission with respect to the investigation of British Columbia water-power resources, were set forth, and the Ministers gave assurance that, so far as the Provincial Government was concerned, every possible assistance would be given. They stated that their Government very much desired to have available just such water-power data as the Commission proposed to gather. The particular ways and means to be adopted by the provincial authorities in co-operating in the work of the Commission, were, partly on account of the difficulties of operating in mountainous country, left undecided until more precise knowledge of governing factors was forthcoming as a result of the first season's work.

Meantime, circular letters and blank forms to be filled in with water-power information, were prepared. These were printed by the British Columbia Government, and distributed to its agents who were dealing with matters appertaining to waters, lands, timber and other resources. Forms were also sent to the land surveyors who were engaged upon Government surveys. Owing largely to the fact that comparatively few of the agents and surveyors could be reached so late in the season, practically no forms have, as yet (December, 1911) been returned. It was also arranged that I would, later, return to Victoria, and discuss with the Hon. Mr. Ross, methods for co-operation in the work of 1912.

In entering upon the field work prosecuted in 1911, it was decided to begin, systematically, to cover the territorial area of the Province. The area south of the Railway Belt, together with the Railway Belt itself, constitutes a stretch of territory which contains the bulk of the population of the Province, and comprises the water-power possibilities which are of more immediate economic importance. It was decided, therefore, to commence our investigations in this territory.

The water-powers in the Railway Belt are administered by a branch of the Department of the Interior and an office had recently been established at Kamloops, under the direction of Mr. P. A. Carson, who had commenced hydrographic investigations in the Belt. It had been arranged that work performed by his staff would include the collection of water-power data, and that these results would be available for the purposes of the Commission of Conservation, but the need of data respecting irrigation records was so pressing that Mr. Carson was unable to undertake this work. It is hoped, however, that this will be done in 1912. Measurements of flow upon some of the larger rivers, such as the Fraser, the Thompson, the Columbia and the Adams have already been made. Gauge heights are also being systematically taken. Such information will be of great assistance in connection with water-power problems.

The avenue for securing data for the Railway Belt being thus provided, work was commenced in East Kootenay, with Fernie as the first base. The general plan of work adopted was to have engineers make reconnaissance surveys of the rivers and streams. The men, horses, etc., were engaged, as circumstances required and, in this way, the expense of the work was kept as low as possible. Three engineers, Messrs. G. H. Ferguson, D. C. Jennings and C. C. Lyall, continued upon the work until the first week in November, when, after a fine autumn, the inclemency of the weather compelled a cessation of operations. At this time, nearly all the waters of East and West Kootenay had been investigated. The heights of the various falls and rapids were measured, and, where possible, and expedient so to do, the flow of streams was determined by meter measurements. These, and other appurtenant data, will be reduced during the winter, and put into form to be incorporated in the proposed report on the water-powers of Western Canada.

After the field operations were terminated, I returned to Victoria to arrange for co-operative effort between the provincial authorities and the Commission of Conservation. The British Columbia Government, it may be remarked, has a Waters Branch administered by the Board of Water Commissioners, Messrs. J. F. Armstrong and Mr. G. Gray Donald. It is the intention of this Board to make special investigation of the provincial water-power resources, but, up to the present time, the investigation of, and adjudication upon, provincial irrigation rights and records, has been a complex subject of urgent and paramount importance. During 1912, however, the Commissioners will assist as opportunity offers, and, further, will

HYDRO-ELECTRIC PLANT, WEST KOOTENAY POWER & LIGHT CO., BONNINGTON, B.C.

seriously consider delegating two, or more, of their men for special water-power investigations. The Hon. Mr. Ross said that he believed if effort were made to arouse more interest in the general subject of the provincial water-power resources, a number of the many surveyors engaged upon Government surveys, might turn in reports upon waters in districts being surveyed. This opinion is shared by Mr. G. H. Dawson, Surveyor-General of the Province. It was agreed that special instructions, relating to the securing of water-power data, be prepared. These instructions are being framed by me and will be printed and incorporated by the Surveyor-General in his instructions to British Columbia land surveyors. Mr. Dawson said that he would devise some means by which the information will be secured in territory where he deems it advisable to call for it. A number of copies of the *Water-Powers of Canada* report have been sent to him for distribution to British Columbia land surveyors, with the object of evoking special interest in water resources. The Hon. Mr. Ross also said that provision would be made to meet any reasonable expenses incurred, incident to the co-operative effort proposed to be undertaken by his Department.

A considerable amount of cognate information has already been supplied by the Provincial Water Commissioner's Branch; the engineering offices in British Columbia of the Department of Public Works, Canada; the Railway Lands Branch of the Department of the Interior; railway companies; and by some of the power companies operating in British Columbia, especially by the British Columbia Co., and the Western Canada Power Co.

In December, in response to an enquiry sent the Commission of Conservation by the municipality of Red Deer, Alta., asking for some information regarding the water-power possibilities of the Red Deer river, in the vicinity of the town, I was sent to examine the situation. A report was made to the municipality in which were embodied such conclusions and suggestions as the situation warranted. Hydraulic data relating to this river were obtained in the Calgary office of the Irrigation Branch of the Department of the Interior.

In 1912, it is proposed to deal with the territory lying south of the Railway Belt, between West Kootenay and the coast, together with, at least, a portion of the coast, along with Vancouver island and some of the territory tributory to town sites along the line of the Grand Trunk Pacific railway. It will be considerably more expensive to conduct investigations in some of these districts than in the districts covered in the autumn of 1911.

Mr. Sifton: We shall now have a short report from Mr. Patton on the publications of the Commission and the work of collecting information.

COMMITTEE ON PRESS AND CO-OPERATING ORGANIZATIONS

Mr. Patton said:

There has been a large increase in the number of publications issued by the Commission, with a corresponding increase in expenditure. The following table gives details regarding the number, size and cost of the various reports published since the last Annual Meeting.

Publications Issued, 1911

Publication	No. of Pages	No. of Copies	Total Cost*	Cost per Copy
Second Annual Report . . .	237	10,000	$ 3,696.20	$ 0.37
Agricultural Work in Ontario and Unsanitary Housing .	61	10,000	1,475.45	.147
Ottawa Typhoid Epidemic Report.	54	2,500	777.75	.311
Lands, Fisheries, Game and Minerals.	526	15,500	13,001.23	.838
Five "Separates" from above Report:				
Agriculture in Canada.	34	300	54.53	.181
North Atlantic Fisheries Dispute.	63	600	188.04	.313
Canadian Oyster Industry.	19	300	30.47	.101
Whitefish in the Great Lakes.	47	300	75.38	.251
Fish Culture.				
Fisheries of P.E.I., Man. and B.C.				
Game Laws of Sask.	42	300	67.36	.224
Game Fish of Quebec.				
Game of P.E.I., N.S., Que. and B.C. . . .				
Animal Sanctuaries in Labrador	38	3,000	126.86	.042
Water-Powers of Canada. .	403	15,500	14,038.96	.905
Press Bulletins	. . .	5,800	22.40	

*Does not include cost of translation into French nor cost of distribution.

The cost of illustrations, as compared with the cost of printing and binding is shown in the following table:

Analysis of Cost of Principal Publications, 1911

Publication	No. of Pages	No. of Copies	Composition, Stock and Binding	Maps, Half-tones and Diagrams	Total Cost	Cost per Copy
Second Annual Report	230 + vii	10,000	$3,661.20	*nil*	$3,696.20*	$0.37
Ottawa Typhoid Report	48 + vi	2,500	268.20	$509.55	777.75	.311
Lands, Fisheries, Minerals	519 + vii	15,500	8,407.95	4,593.28	13,001.23	.838
Water-Powers of Canada .	396 + vii	15,500	7,249.25	6,789.71	14,038.96	.905

Distribution

Nearly all the reports of the Commission sent out are addressed by a Montague Rapid Addressing Machine, which addresses envelopes at the rate of 1,000 an hour. We now have 8,638 names on stencils for this machine and, in about a month, will have 10,878. These stencils are classified into such classes as newspapers, boards of trade, libraries, Canadian Clubs, agricultural societies, municipal officials, medical health officers, engineers, those interested in fisheries, minerals, etc., etc.

A waste in distribution occurs when the reports of more than one Committee are bound in one volume. For instance, our report on *Lands, Fisheries, Game and Minerals* was distributed widely among the farmers of Canada on account of the "Lands" section being of interest to them. It is doubtful if the large "Minerals" section would be of much interest or value to any of these farmers.

In accordance with the recommendation the Committee made at the last Annual Meeting, "separates" of papers appearing in the reports were issued in pamphlet form. It has been found that when issued in this way, these papers received more notice from the press than when buried in a large report.

Other Duties of Editorial Staff

The spare time I have had from my duties as Assistant Secretary and Editor has been devoted to an investigation of the question of fire waste in Canada. A report on this will be ready in the first half of 1912, as soon as the statistics for 1911 are obtainable.

Mr. Donnell, the Assistant Editor, when not employed on editorial work, has been preparing a report on "Public Revenues from Canadian Forests." This will be completed by the end of January.

Inadequate Statistics

In pursuing these investigations, as well as in the editorial work, the editorial staff have been strongly impressed by the lack of adequate and even accurate government statistics. I would suggest that the Commission, at the Annual Meeting, pass a resolution calling the attention of the Dominion Government and the Provincial Governments to this matter and offering to them the services of the officials of the Commission for devising a system for the compilation of more comprehensive statistical information.

Mr. Sifton: Now gentlemen, we shall have a short address from Dr. Fernow, who will give us a review of his work on the forest survey of Nova Scotia.

FOREST SURVEY OF NOVA SCOTIA

Dr. B. E. Fernow said:—

Mr. Chairman and Gentlemen: I did not know until a few minutes ago that I was expected to say anything, because this was not a work with which the Commission had anything to do; it was an affair of the Province—a forest reconnaissance of the Province of Nova Scotia, which, curiously enough, came as the result of a movement on the part of the lumbermen of that Province. I should not wonder if it was due to some impression I made on them in 1908 at one of their conventions, when I pointed out that it was desirable to know something about the Province before one talked about it. As a result, in 1909, it was decided to make this forest reconnaissance and I have no doubt that the cheapness of the proposition made it attractive to the Government. I offered to undertake a survey of the 21,000 square miles of the country for $6,000. I did not feel quite sure that I could do it, but I was willing to put up the balance myself if I did not. The result has been that we have spent $5,000 in securing a report and a map which contains a classification of the country into eighteen different classes.

We secured data to show the farm area, meadows and savannahs; the forest area divided into types: conifers, deciduous and mixed forest; virgin, slightly culled and severely culled; the burned areas, the young growth and the waste areas, divided into those that are apparently recoverable and those that are unrecoverable. Thus there are eighteen different classes of country that are noted on the map and whose areas are figured out in the Report.

I may say that the original data were compiled on a map on a

scale of two inches to the mile, which is quite a large sized map, and this has been reduced to one inch to four miles.

Perhaps you would like to know something about the method of procedure. I would say here, that a method which is applicable in one place may not be applicable in another place. To illustrate how different the methods may be, I may say that I had made preparations to go into the field with blanks printed, and I had determined my method in the office, but after I had been out in the field for two days, I threw everything overboard and had everything changed, because I found the situation quite different from what I had supposed.

Nova Scotia is a province which is well settled. In every part of it there are small farmers; you cannot travel more than five or six miles without finding a farmer, and these farmers are usually also the owners of timber lands and know exactly the condition of their lots. It was therefore possible to secure information from the owners themselves. We would come to an owner and point out on a map the lots or areas sold by the Government and we would ask him the condition of each particular lot. He would say: "Oh, that was cut over about three years ago." We would ask him if it was cut severely or lightly, and he would tell us. We would then go to a neighbour and ask the same questions and then to a third person, and if they all agreed we would be sure that the lot was as described. If there was any discrepancy in their statements, our men would go and find out how to classify the lot. In that way, it was possible to travel quickly and get information from many sources and also from personal observation.

The main thing in such a survey is to have the right kind of men, and we were fortunate in having a good group. There was first of all, a timber looker, one of my first students in the United States who had been in charge of the timber work of the Northern Pacific railway for many years, a man who could "look" wholesale. Then there was a local man, a Provincial fire ranger, who was used mainly to determine our methods of procedure, the route, etc., after discussion in connection with the map. He was a very valuable man, because he made it possible for us to make fast progress over the ground. Then we had two of my assistants who had knowledge of forestry but not much of timber looking, but who, during the summer, learned a great deal about it. With this oganization, it was possible to secure the information at 25 cents a square mile, a figure which seems almost incredible.

I shall give you a few data although my statistical memory is not well developed, and I have not the Report at hand. It was ready last summer, but has not yet been printed.

We found that the farm land represents something less than 20 per cent. of the area of the Province. I think there was 52 and a fraction per cent. of green forest area on the mainland and a little more on Cape Breton Island. This was classified into virgin, slightly culled and severely culled—a classification used to secure an estimate of the contents. Of virgin forest there is really none, although we called it virgin where only the heavy timber was taken out long ago. Of this, there is something over 100,000 acres. Then there is the burnt area and the young area without timber, about 13 per cent.; the waste area recoverable, 10 per cent., and the natural area, 10 per cent. So we secured a considerable amount of information as to the distribution of these various conditions.

Then we had at our disposal the estimates of the various lumber companies of the Province, which enabled us to assign to each one of the conditions a certain amount of timber standing. We figured out a total of eight and a half billion feet of lumber which you may call, in round numbers, ten billion feet.

Senator Edwards: Immediately usable?

Dr. Fernow: Immediately usable, merchantable timber. If you increased our estimate to ten billion we would not say a word against it because we claim these figures to be only grand totals approximating the truth. But it is a curious experience how closely such estimates can be brought to the actual facts. The distribution of classes of timber among these ten billion feet we found to be about in this proportion: spruce, 5; hemlock, 3; white pine, 1.

An investigation into the soils involves an examination of the various barrens. Some of these barrens are natural barrens, due to glacial action, etc., and are not recoverable. Others are probably the result of repeated fires and therefore, are probably recoverable.

We also estimated the rate of growth and found that spruce did not grow as rapidly as the lumbermen supposed. They had an idea that they could produce pulpwood 12 inches in diameter in thirty years. I have been combating that statement all along. It is, of course, a matter, not of opinion, but of reference. I always carry with me as an exhibit this little piece of spruce which is a hundred and four years old (producing a cross-section of a spruce tree less than an inch in diameter). This shows how slow a tree *may* grow.

Senator Edwards: You have to use a microscope?

Dr. Fernow: Yes. This comes from Saskatchewan. We investigated 500 odd spruce trees in Nova Scotia and found that their rate of growth was the same as in the rest of the world: that it takes a hundred and twenty years to grow a 12-inch spruce.

There has been some question as to who is to publish the report. The Province is ready to publish it, the Forestry Branch of the Department of the Interior has asked to publish it and this morning Mr. White, our Secretary, held me up and said that I had promised the Commission the printing of the report. To me it is immaterial who prints it. I think myself that this Commission is the right agency because it can give it publicity to all who desire information regarding one portion of the Dominion. It is my opinion that the Commission could not do anything better than to stimulate the different Provinces to secure, in emulation of Nova Scotia, absolute and accurate information about their timber resources.

The present mill capacity of Nova Scotia is capable of exhausting this merchantable timber in twenty years or less. In that time they would cut this whole 10,000,000,000 feet.

Senator Edwards: Then they had better reduce the mill capacity right away.

Dr. Fernow: If they do not reduce it, it will reduce itself because the timber will be gone. That is about the impression I would leave: we found that there is twenty years of stock on hand in Nova Scotia. Natural reproduction will, of course, fill some spaces, but it will not do it as fast as the Nova Scotia lumberman has believed.

I leave it to the Commission to decide whether they can co-operate with the Province in publishing this report if it is deemed worthy of publication and thus give an example of how the Commission might proceed from province to province in securing similar information through co-operation.

Mr. Sifton: We have not a definite report from the forestry branch of our work. As a matter of fact, we have no forester connected with the staff at the present time. We had two gentlemen employed during the last year but it was not deemed advisable to continue their services. We have therefore not put in shape anything of a definite report as yet, although a statement will appear in our annual proceedings when published.*

But I do not want you to think that we have not accomplished anything in connection with the forestry branch of our work because we are not presenting to you this morning a definite report. On the contrary, we have, I think, accomplished a very great deal.

*See p. 21

We practically accomplished, almost in their entirety, the two great things we set out to accomplish a year and a half or two years ago. You will remember first, that we made up our minds we were going to keep on agitating until we got the Rocky Mountains Forest Reserve established, and it has finally been defined and established by Act of Parliament. Thus there can be no possible question about the continuity of policy in respect to it. We are sure of the perpetual existence of that park, which, if not the greatest, is probably one of the greatest forest parks in the world. There are nearly 18,000 square miles in this one single forest park on the eastern slope of the Rocky mountains. You can see the outlines on the map which is before you.

Further, I am satisfied that the Department of the Interior through its Forestry Branch, presided over by Mr. Campbell, who, I think, has done excellent work, is working hand in hand with us to bring about the equipment of the park with a proper staff which will be, not only the means of preserving the forests for the benefit of the country through which the streams run from their forest heads, but will also provide a school of forestry for the whole Dominion of Canada. That is one thing that our forestry branch has accomplished.

Another thing which, at first, seemed more difficult than that, has also been accomplished. We set out to secure an amendment to the law which would make it the duty of railway companies to protect adjacent forests from fire from their locomotives. I myself, had come to the conclusion that it was useless to talk about forestry while the railway companies were permitted to burn up the forests very much faster than Nature could restore them and very much faster than even the lumbermen could destroy them. I, therefore, thought it was our duty to set to work at once to conduct a vigorous and determined agitation in favour of improving the conditions in respect to the question of forest fires. I further had this idea, which I am satisfied is correct, that it was useless to try to punish private individuals for setting out fires, bringing them before magistrates and sending them to gaol, while railway companies were burning hundreds of square miles of territory without punishment. You may have a law on the statute books, but you cannot enforce it if it is contrary to natural justice and common sense. You cannot secure the enforcement of a law which requires the camper who carelessly sets out a fire to be put in gaol, while railway companies are permitted to start fire after fire all along their lines with no one to say a

word to them. That is contrary to natural law and justice and you never could get such a law enforced and it never was enforced.

So the root of the whole difficulty was in respect to the law relating to railways. We have got the law amended and, after a great deal of thorough and careful consideration, it was decided that, instead of making an inflexible penal provision which had been suggested in the first place, but which would be very difficult to enforce and not generally very satisfactory, the Railway Commission should be empowered to make regulations compelling the railway companies to protect their lines and to install an efficient system of fire protection.* That law is now in force; it was passed last session and the Railway Commission now has the subject under its advisement. It is not an easy matter to devise the regulations and I want to suggest that our Committee on Forests devote itself to the assistance of the Railway Commission in connection with the devising of proper regulations. That, if accomplished, will be one good year's work for our Committee.

Further, I want to say that I am quite sure that Judge Mabee, Chairman of the Railway Commission, will welcome their assistance warmly. He unquestionably desires to promote the public interest in the most effective way. Thus, so far as the legislation is concerned, our object has been accomplished to an extent that did not look possible when we started.

The Province of British Columbia is at present an applicant to the Railway Commission for the purpose of getting an order passed requiring the railways in British Columbia to protect the territory traversed by their lines, and, on February 6, there will be heard the application of the Department of Lands of the Province of British Columbia, for an order regulating the operation of railway companies within that Province with regard to the spreading of fires to adjacent lands during the dry season of the year. So we have something practical; we have the law passed and the Railway Commission about to deal with the question. We are now entering upon a phase of the question of protection of forests from fire in Canada where we are doing something practical; we have begun to get something done.

That completes our programme for this morning. This afternoon we shall have a short address from Dr. Robertson on the work of the Committee on Lands, that is the agricultural branch of the Commission, and then we will take up the question to which I have made reference. I do not think it will take us long, but the matters are of considerable importance.

*See p. 22 for extracts from this Act.

The meeting then adjourned until three o'clock in the afternoon.

Afternoon Session

The Commission resumed at three o'clock, Mr. Sifton presiding.

MR. SIFTON: The first item is the address of Dr. J. W. Robertson, Chairman of our Committee on Lands.

WORK OF THE COMMITTEE ON LAND

DR. ROBERTSON said:—

Mr. Chairman and Gentlemen: I need say but little by way of supplement to what Mr. Nunnick put so well in his written memorandum this morning. The Commission carried on an investigation in the nature of an agricultural survey of 1212 farms. That meant a great deal of work.

Agricultural Survey

The records made and the conclusions arrived at were the joint judgment of the men on the farms and the collectors of information for your Committee, The information is not second hand or superficial: it gives a knowledge of the real conditions of those farms.

Object of the Survey

The object was to discover whether there was conservation of fertility, conservation of labour and conservation of health. Those were the three main objects of our diagnoses. We discovered a good deal; we found that there was hardly any systematic conservation of fertility outside of Ontario, that, in most of the provinces, the farmers are living on the accumulated capital which Nature provided in the soil, leaving their lands poorer because they had been on them.

A Scarcity of Labour

There is a general scarcity of labour. One reason given is the lure of the West, where people go and again, in most cases, live on the capital stored up in the soil. Another reason for the scarcity of labour is that the system of farming followed permits a farmer to employ hired labour for only four or five months in the year. The men who employ labour for twelve months say they have less trouble getting enough labour and good labour. You could not learn that in an office at Ottawa, or on an experimental farm, or at an agricultural college. These collectors of information, in carrying on the investigation for

the Commission, are not entering on a field hitherto cultivated by anybody else.

Soil Fertility

There are a few prominent features in regard to the conservation of fertility. First of all, let me observe that the yield of the crops on a farm is not in itself, evidence as to whether the farmer is conserving fertility or dissipating it—not at first. The man may be robbing the land by taking off it as big crops as possible. He may be harrying the land as a boy harries a bird's nest. As a matter of fact, the yield of the crops per acre in Canada on the whole is not satisfactory; and yet, on many farms the yield is increasing.

Crop Yields

I will give some instances. In the Province of Nova Scotia, 49 per cent. of the farmers whose farms were examined report larger yields than they had ten years ago. That is, one-half of them report a decided increase from ten years ago, after the land has been in use forty or sixty years. From Prince Edward Island, 51 per cent. report increases, dating from fifteen to eighteen years ago. Until that time there was a gradual decrease. They were shipping oats to the United States. When they began to follow dairy farming, the raising of clover and of live stock, a gradual improvement commenced, and now 51 per cent. of them report an increase in crops. In New Brunswick, 24 per cent. report an increase and 12 per cent. a decrease. In Quebec, 39 per cent, report an increase and 4 per cent. a decrease. In Ontario, in good sections, 24 per cent. report an increase of 50 per cent. in their crops as compared with ten years ago.

SENATOR EDWARDS: What do you mean by 24 per cent.?

DR. ROBERTSON: Twenty-four per cent. of all the 300 farms examined. There were 1,212 farms in all, 100 in each of the Maritime Provinces, 200 in Quebec, 300 in Ontario and 100 in each of the Western Provinces.

SENATOR EDWARDS: What percentage in Ontario?

DR. ROBERTSON: Twenty-four per cent. of the farms examined in Ontario report an increase of 50 per cent. in crops. In this Province, only 4 per cent. of those examined report a decrease.

We are all building our hopes on the West, that is, those of us who let ourselves flow with the tide and volume of newspaper articles. "The West is the hope of Canada." The Province of Manitoba is a good province. In Manitoba, not one farmer reports an increase in the yield per acre and 46 per cent. report an actual decrease in

the yield per acre. The decrease of yield per acre in that province must be concurrent with exhaustion of fertility.

Rotation of Crops

Take an old country like England. The records of English agriculture a few centuries ago are very scanty. They had no Commission of Conservation. As far as I can gather from some records of four hundred years ago, the yield of wheat in England was about 26 bushels to the acre; and two hundred years ago it was down in certain areas to 8 bushels to the acre. These were the Dark Ages in agriculture as well as in other respects. To-day the production of wheat stands between 32 and 34 bushels to the acre on the average over the whole of England. What made the difference? Chiefly the systematic rotation of crops. When you come to discover the causes, and the methods of their application, that made English agriculture rise in this way, the systematic rotation of crops, with clover or beans between the cereals, comes out clearly as the most powerful and important.

Senator Edwards: Is there not a large use of commercial fertilizers there?

Dr. Robertson: That has helped to maintain the rate. Take the Experimental Farm at Rothamsted, where operations have been carried on for over sixty years. In one experiment extending over thirty-two years, the yield of wheat under systematic rotation of crops was compared with the yield under similar conditions but without any systematic rotation. Under the rotation, there was an increase of 114 per cent. when a clover or bean crop came into the rotations, as against the growing of cereals only. Similar results have been observed on many farms in England, apart from the effects obtained from manure or fertilizers. By the use of a rotation, including the bean or clover crop, there has been an increase of from 100 to 150 per cent.

The enquiry for the Commission in 1911 was directed to learn whether our people were conducting farming by means of a systematic rotation of crops. We know that that was a chief means in England and other countries of conserving the fertility and increasing productiveness. That is why the report of our Agriculturist suggests that a bulletin on rotation of crops should be prepared, not so much for the purpose of furnishing detailed information, as for inducing the farmer to make an investigation on his own farm into his methods, into his own conditions, in order that he might plan to farm better, to seek more light, and to help his neighbours. It is

not to be a bulletin of instruction such as an Experimental Farm would issue after experiments, but a bulletin to stimulate the farmer to consider whether his way is a good way and whether he could not adopt a better way and, if so, with what results to himself.

In the Province of Nova Scotia, only 8 per cent. of the farmers state that they follow any systematic rotation of crops. The systematic rotation of crops has been the salvation of farming in England and in other countries by getting large yields and protecting fertility. In Prince Edward Island, 6 per cent. report that they follow a systematic rotation of crops; in New Brunswick, 13 per cent.; in Quebec, 4 per cent.; and in Ontario, 53 per cent. In all these provinces, a good many other farmers follow a systematic rotation on a small part of the farm, but not a general scheme of rotation for the farm as a whole.

Mr. McCool: What section of Ontario is that in?

Dr. Robertson: Six counties: Dundas, Lanark, Ontario, Waterloo, Essex and Norfolk. In Quebec, the counties were Huntingdon, Pontiac, Brome, L'Assomption, Charlevoix and Bellechasse.

Mr. McCool: They are fairly representative.

Dr. Robertson: In New Brunswick, where few followed systematic rotation, it was found that, where a four- or five-year systematic rotation was followed, the results were in every respect far ahead of those on the neighbouring farms, or on the same farms before the adoption of the rotation. In Nova Scotia, the results obtained from systematic rotation gave from two to three times as much feed for stock. In Pontiac, Que., the rotation was very little followed and the weeds are getting very bad. The two go together. Wherever you find a small percentage of systematic rotation you find an immensely high percentage of weeds. In Huntingdon, Que., the rotation of crops is general. Any one who knows Quebec knows that in Huntingdon—where they have the fine horses and the Scotch accent—there is good farming. The two do not always go together, but you have it there because the farmers follow the systematic rotation of crops. To illustrate the importance attached to the systematic rotation of crops in the Old Country, I may say that, in an old lease of which I knew forty years ago, rotation of crops was inserted as a condition of the lease. Sixty years ago the farmer had to follow a rotation or the lease would be cancelled. We could not be as drastic, even by Government regulations. The compulsion exercised in the Old Country was a good thing for all concerned, and we are getting some of the fruits in Huntingdon, Que., now.

This is the general conclusion of the farmers: that where short rotations are followed they get anywhere from two to three times more profit—not two to three times more crop but two to three times more profit—and moreover, they have cleaner farms with more conservation of fertility. These things are worth seeking surely.

Selected Seed

Some other matters were investigated. One was the use of selected seed grain on farms. There has been an awakening on that subject all over Canada within the last ten years, and an immense change has taken place. A common practice in Ontario, is for the farmer to select the best part of his best crop, store that by itself, have it threshed by itself, have it specially cleaned and use it for seed. This he finds of great benefit. The selection of seed grain, as distinguished from grain fit for feeding purposes, has been a practice from time immemorial among intelligent people. And yet, in enlightened Canada within the areas covered by this survey, some farmers sowed an extra half bushel of grain to the acre to make up for the dirt and weeds in their seed. That very dreadful state of affairs is quite exceptional; but we need improvements in regard to preserving the fertility of the soil and conserving the labour of Canadian farmers.

You will have noticed that a farmer from Canada took the $1,000 gold prize at the big Back-to-the-Land Exhibition in New York, for the best bushel of wheat from North or South America. I did not know all the facts at the time I visited the exhibition. When I came to Ottawa, I found a letter from the prize winner, Mr. Seager Wheeler, of Rosthern, Sask., thanking the Canadian Seed Growers' Association for putting him into the way of getting good seed for his farm and having such good crops and such good quality of wheat as to win this prize. The man who won the $1,000 gold prize for the best potatoes, a British Columbia farmer, is also associated with the Canadian Seed Growers' Association and followed its system. These prizes are two outside tributes that did the country a great deal of good. Another member of the Association said he sold from his 1911 crop, 15,000 bushels of wheat as seed at $2.00 a bushel and could not supply the demand. The West has wakened up to the advantages of using selected seed and the other provinces are becoming aroused.

Weeds and Plant Diseases

Let me now refer to the questions of weeds and plant diseases. I sit in the office, I get together some books and papers, I call up a recollection of what I learned from a rather wide and long experience, and then I write a

bulletin on the advantage to the farmer of treating his seed grain to destroy the spores of smut so that there will not be any smut in the heads of oats in his crop. The farmer reads that and says to himself: "Smut, what the mischief is smut?" Many farmers do not know the meaning of systematic rotation of crops as a phrase; it conveyed no meaning at all to some of them when the survey was commenced. One man, when asked if he suffered much in his oat field from the presence of smut, said: "That is not worth bothering about, I am not worrying about smut." Our Agriculturist reached out his hand, and, without moving from the one spot, picked forty-three heads that were filled with smut instead of oats. The farmer said: "I will not have any more smut." You see the value of having a competent visiting or resident instructor with practical knowledge of these things. In that way, the farmer obtains knowledge that he could not acquire in any other way.

The Russian sow-thistle is becoming so bad that in the county of Lanark, in Ontario, the farmers say that some farms will be abandoned. How do we regard the invasion of an enemy that comes right in and defeats the persons in possession and puts them right out? If that invader were a Chinaman or a Jap, we would call up all the powers in Canada to have him put out, but, because it is only a common weed that brings dispossession and wasting desolation in its train, our indifference says it is not worth bothering about.

In the county of Waterloo, Ont., this weed came in only six years ago and "it is getting established and becoming very bad." That is what the farmers themselves say. They are not doing anything about it, except the few farmers who are following a systematic rotation of crops. They say that in the county of Ontario the farmers are controlling it by a rotation of crops. These are the statements of the farmers to the collectors of information who go over the fields with them on behalf of this Commission.

As to wild oats, I may recall to your mind that last year, in speaking briefly of the work of the Committee on Lands, I said that 100 per cent. of all the farmers in Manitoba reported wild oats. We added one new district to the survey this year. Generally, we are surveying the same areas as last year, but we have also some additional districts. From Manitoba, this year, the report comes that 94 per cent. have wild oats. Last year we had 71 per cent. reporting wild oats in Saskatchewan and 3 per cent. in Alberta. This year we have 31 per cent. reporting wild oats in Alberta. The invasion is widening and becoming faster. That is a very serious matter.

In a few places, the farmers say that there are areas in the West which are being abandoned owing to wild oats and the stink weed. Is it a wise thing for the nation to be inviting immigrants to occupy new lands, while we are letting lands that have been occupied, lands in better situations, be taken from us by any agency that thwarts us because we are either ignorant or indifferent?

In Brome county, Quebec, the orange hawk weed has become so bad that pasture fields carry only half the cows per acre that could graze a few years ago.

I have pointed out these matters to indicate the grave nature of the menace in Canada, especially in the Northwest where a systematic rotation of crops appears not to be feasible to the same extent as in Ontario and the other Eastern provinces, owing to climatic conditions and other limitations.

To other questions arising out of our investigations, I shall refer only in a word. There is the sowing of clover with the grain crops to enrich the soil by the roots and the portion it leaves in the soil afterwards. When that is done, the crop next year, yields two to six bushels of grain more to the acre. To the West, especially, that is immensely important. In these Western fields the fibre that holds the soil in place should be renewed from year to year. You know that the prairie grass has quite a fibrous root, which, for years, held the cultivated soil in position. Out on the prairies investigation shows that the winds blow on an average some twenty hours a day. Of course, they are not always severe, but, when the spring winds are strong, it is not an uncommon thing now for farmers to report that the winds blew away the top soil and the seed, because there was not enough fibre in the soil to hold it in place. The only thing to save that country is to get some crop in between the cereals, some grass crop or clover crop, some crop that will leave fibre to hold the soil in position and to hold moisture ready for the wheat crop in the summer. These two things are essential for the conservation of our national property and the property of the individual farmer who holds the land.

Illustration Farms

We should do something further than we have done. I have no ambition to help to provide a lot of records that will serve an archivist a hundred years hence; I would rather withdraw from decent behaviour as a responsible citizen and play golf all summer and go south for the winter. I think our Commission has no desire to make records only to be scanned by an historian, when he comes to enquire into Canadian

agriculture. I would rather record any history I help to make in Canada in the character and the capacity and the attitude of its people.

In these farm surveys the farms are judged by a scale of points with the concurrence of the owners. So many points are given for the "Plan of Rotation;" so many for "Crops;" so many for "Production and Care of Manure" and so many for "Equipment." This has a very beneficial effect and stimulates a desire on the part of all the farmers to improve their methods and conditions.

The farm which is scaled highest in any locality is, of course, looked up to by the neighbours who are less successful. It becomes, naturally, the illustration farm of the locality. The farmers in the district are anxious to have the illustration farms in their neighbourhood rank high, and this has an influence in encouraging improvements among the farmers of the district.

It is by standing beside the farmer that one finds it possible to help him. By using one or two of these self-selected illustration farms in a district we may be able to assist in their further improvement. This will assist all the farmers in the district. Our Agriculturist cannot go in and manage the farms. Our Commission has neither the money nor the skill to do that, but our Committee would like to co-operate with these illustration farmers for purposes of investigation and demonstration. In all this we must concentrate on a few farms. If you get the farmers of a district to concentrate attention on a few farms, it is possible to accomplish something. We all know the value of concentration on something definite, on something the people will understand and see often, on something they think worth while. If this Commission were able to induce farmers to use three of their own illustration farms in each county for a purpose definite and well known, and to unite and co-operate under our guidance to make them better, we would soon see in Canada a marvellous advance in the practices of crop rotation, weed suppression, seed selection and all that sort of thing. These make for conservation of fertility and increase of prosperity. I hope the Commission will approve of what the Committee on Lands proposes to do in that direction this year.

Forage Crop Illustrations

The alfalfa investigations and illustrations have been successful, and we hope to extend that work to Manitoba and the West in connection with grasses or plants that will hold the soil.* We hope to extend our work in the

*See Professor Klincks' report on p. 16

survey of farms by having one or two farms in every district recognized as illustration farms. We will try to organize the local farmers for purposes of investigation and co-operation with each other and with our Committee. We venture to hope that in three or four years our joint efforts—the farmers and ours—will produce an increase of 50 per cent. in crops on these illustration farms, and a corresponding increase in the whole locality. We expect to find all the farmers wanting to increase their crops, to suppress the weeds and to preserve the fertility of their soil.

I have talked too long, but I wanted the Commission to know that the Committee on Lands is working on lines of investigation that promise good results, and is seeking the co-operation of local farmers towards associated effort, by themselves and for themselves under our guidance. I believe that the Committee on Lands will give a fairly good account of itself in the coming year.

Mr. Sifton: We shall now have some remarks from Mr. R. H. Campbell of the Forestry Branch of the Department of the Interior, with reference to the laws relating to forest parks, especially the Rocky Mountains Forest Reserve in which we have ourselves taken so much interest.

THE ROCKY MOUNTAINS FOREST RESERVE

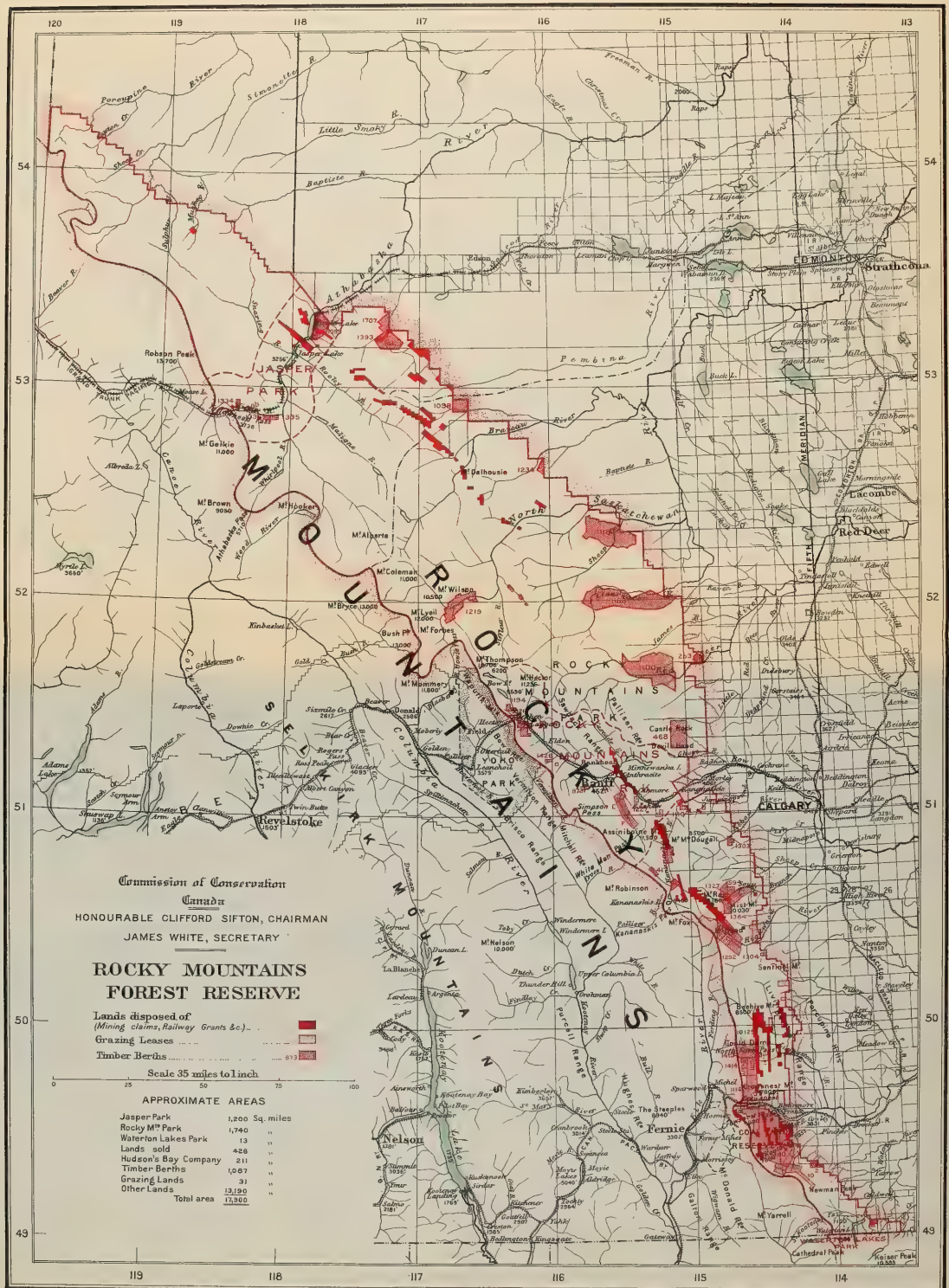
Mr. Campbell said:

Mr. Chairman and Gentlemen: I have been asked to speak particularly in regard to the Rocky Mountains Forest Reserve, which is one of the most important forest preserves that we have in the Dominion of Canada, and one in which the Commission of Conservation has taken a very special interest. In doing so, I might explain the authority under which the reserves under Dominion jurisdiction are established. That will lead on naturally to the question of this particular reserve and the method of its administration, which will be a sample of the administration which we hope to follow in general on the reserves that come within our jurisdiction.

Extent of the Reserve

This tract on the eastern slope of the Rocky mountains (indicating on the map) is a mountainous tract. The portion that is coloured pink shows the Reserve as it was set apart by an Order in Council passed in 1910.* That

*The accompanying map shows the Rocky Mountains Forest Reserve as defined by the Act of 1911.


Commission of Conservation
Canada
HONOURABLE CLIFFORD SIFTON, CHAIRMAN
JAMES WHITE, SECRETARY
ROCKY MOUNTAINS FOREST RESERVE
Lands disposed of (Mining claims, Railway Grants &c.)
Grazing Leases
Timber Berths
Scale 35 miles to 1 inch
0 25 50 75 100
APPROXIMATE AREAS
Jasper Park 1,200 Sq. miles
Rocky Mtn Park 1,740 "
Waterton Lakes Park 13 "
Lands sold 428 "
Hudson's Bay Company 211 "
Timber Berths 1,087 "
Grazing Lands 31 "
Other Lands 13,190 "
Total area 17,900 "
ROCKY MOUNTAINS
SELKIRK MOUNTAINS
PURCELL MOUNTAINS
JASPER PARK
YOHO PARK
KOOTENAY PARK
WATERTON LAKES PARK
Athabasca R.
Miette R.
Fraser R.
Yellowhead Pass
Robson Peak 13,700
Mt Geikie 11,000
Mt Brown 9050
Mt Hooker
Mt Alberta
Mt Coleman 11,000
Mt Wilson 10,500
Mt Lyell 12,000
Mt Bryce 13,000
Mt Forbes
Mt Thompson 12,000
Mt Hector 12,136
Mt Mummery 11,000
Mt Dalhousie
Bush Pk 13,000
Donald
Revelstoke
Mt Nelson 10,000
Mt Robinson
Mt Fox
Mt M'Dougall
Assiniboine 11,870
Simpson Pass
Castle Rock 468
Devil's Head
Banff
CALGARY
Lacombe
Red Deer
EDMONTON
Strathcona
Nelson
Fernie
Crowsnest Mt
The Steeples
Sentinel Mt
Mt Yarrell
Cathedral Peak
Kaiser Peak 10,000
Base map from plates of Map of Dominion of Canada, Dept of Interior

Order in Council was passed without any special examination of the slope upon which we could base our definition of the boundary. In the following season, we had two parties working on that eastern slope to ascertain where the proper boundary should be. After consulting with people in the district generally, and after the observations that our men were able to make, we came to the conclusion that a general elevation of 4,000 feet would be about the right one for the eastern boundary of the Reserve. That meant that everything above 4,000 feet was to be made into a reserve and to be administered as a forest. You will see that in the first place the line was drawn considerably west before we had the proper information as to what it should be finally. In the southern portion of the Reserve, the mountain belt broadens out just at the boundary, and, in Montana the eastern slope of the Rocky mountains is wider than it is farther north. It narrows going north and in the southern part of Alberta the mountains break very abruptly into the prairie. There is very little foothill country, the reserve coming close into the base of the mountains here. But farther north you will notice it is broadening out, and finally, it gets to be a very wide reserve with a very extended foothill country. That is the general character going north. This angle is the angle of what was formerly the Rocky Mountains Park, set apart by Act of Parliament a number of years ago. In making the examination, we found that there were some districts even outside of that which should be taken in as forest reserve lands.

Timber

The general character of the Reserve most of you know pretty well, but I might explain that it rises from the foothills at 4,000 feet elevation, into mountains that rise above the timber line and into occasional peaks of 10,000 feet. The timber line is at an elevation of about 6,000 or 7,000 feet. Up to that height, we have a fair growth of timber, so that our line of elevation for the useful portion of this Reserve, so far as timber is concerned, is between 4,000 feet and 6,000 feet.

The trees which are most useful for timber in that district are, the Engelmann spruce, which has been the chief lumber tree in the district, the Douglas fir and the Lodgepole pine. There is some Douglas fir growing to a considerable size, not as large as on the Coast, but a good size and very good timber. Unfortunately, there are no very large areas of Douglas fir. The tree that grows most generally in addition to the Englemann spruce is the Lodgepole pine (*Pinus Murrayana*), found all over the mountain slope from the

south to the most northern district. This tree reproduces very easily. When the soil has been burned over, you will, almost every time, get a reproduction of *Pinus Murrayana* if the fires have not come too frequently. This tree grows fairly fast and strong and it will be very useful indeed in the mines.

Practically every part of the eastern slope of the Rocky mountains has deposits of coal. The quantity of coal that is on that eastern slope has been estimated by the Geological Survey at 22,200,000,000 tons; so that the slope is a very rich one in many ways, not only for the production of timber, but for its coal mining. The coal mining, of course, depends to a very large extent on the proper supply of timber.

The Prairie Water Supply

Then, again, that slope is very important as the watershed for all the prairie country lying to the east. The great rivers that water the prairies of Alberta and Saskatchewan, such as the Saskatchewan, the Bow, the Belly and the Oldman, have their sources in this slope, and the effect which any interference with the forest cover of that mountain slope may have on the flow of those streams is a very important matter for the whole country lying to the east. On the Bow river there are already very considerable demands on the flow of the stream. From that river is taken the water to supply the Canadian Pacific Railway irrigation scheme, which includes a tract of 3,000,000 acres, although, of course, not more than half of that will be actually irrigated. It is also the source of supply for the Southern Alberta irrigation scheme, which proposes to irrigate something like one-half of a 400,000-acre tract. There are also a number of lesser irrigation schemes. Then it is the source of water supply for growing cities like Calgary, Medicine Hat and Saskatoon, and, finally, there are possibilities of the development of large amounts of power, which will mean a great deal for the economic development of the West.

Act Creating the Reserve

Thus, you will see that the eastern slope of the Rocky mountains is, from many points of view, a very important reserve. It has been set apart as a reserve by act of Parliament, and it might be well for me to summarize the provisions of that Act which was assented to on May 19, 1911. This Act withdraws the tract from sale or settlement and provides that it cannot be disposed of except under regulations which are made under the Act. The Act makes provisions for framing regu-

lations for certain purposes within the Reserve. There is the cutting and removal of timber, the working of mines, quarries and mineral deposits, the removal of sand, gravel, earth, stone, or any other material, the pasturage of cattle, the use of hay lands, the establishment and use of reservoirs, water-power sites, power transmission lines, telegraph and telephone lines, and the granting of leases and permits therefor; the preservation of game, birds, fish and other animals and the destruction of noxious, dangerous and destructive animals; the prevention and extinguishment of fire; the prevention of unauthorized business and traffic; the removal and exclusion of undesirable persons and trespassers, and of persons making any unauthorized use of any reserve, or failing to comply with any regulations; the confiscation and disposal of things seized; and all purposes necessary to carry the Act into effect according to its true intent and meaning.

Preservation of Game

You will see that there are many things provided for in connection with the Reserve. I shall first deal with the preservation of game. The forest reserves are very important as forming refuges for game. The whole eastern slope has not been made a game preserve, but certain portions of it have, and I would like to explain the situation in regard to the certain parts which have been designated as parks so that there may be no misunderstanding about it. Before a forest reserve was established, there was a Rocky Mountains Park, which included this area (indicating), about 2,880,000 acres, which was established as a park and game preserve and was administered as such. Later, by Order in Council, a park and game preserve known as the Jasper Park Reserve, was made along the line of the Grand Trunk Pacific, north and south of the Athabaska river, and, in that also, regulations were established for the protection of game. This Act of May 19, 1911, as you can see provided for the protection of game, the protection of timber and several other things under regulations relating to the forest reserves. The immediately following section provides as follows:

"The Governor in Council may from time to time, by proclamation, designate such reserves or areas within forest reserves as he sees fit, to be and be known as Dominion parks, and, subject to the provisions of this Act, they shall be maintained and may be made use of as public parks and pleasure grounds for the benefit, advantage, and enjoyment of the people of Canada.

"2. The Governor in Council may make regulations with respect to such parks for—

"(a) their protection, care and management, and their use and enjoyment as public parks and pleasure grounds;

"(b) the conduct of persons residing in or making use of any park;

"(c) the lease for any term of years of such parcels of land in the parks as he deems advisable in the public interest for public purposes, for the construction of buildings, for ordinary habitation and purposes of trade and industry, and for the accommodation of persons resorting to the parks.....

"(d) the control and licensing of trades and traffic of every description and the levying of license fees.

"(e) the construction, operation and maintenance of water works, sewage, sanitation and other public utilities and for contributions towards the cost thereof, by persons interested in properties benefited thereby."

What I want to point out is that the forest reserve regulations to be established may provide for the protection of game. Whatever the ultimate policy in regard to the matter may be, for the present, only a portion of the Reserve is made into a game preserve. But, in those portions which are made game preserves, we have a fairly effective protection of the game animals—I think as effective a protection as there is in any part of Canada. I know that in the district surrounding Banff during the last two or three years since we have been giving them close protection, the deer have been coming into Banff quite frequently, and we have had more or less trouble from time to time with bears getting a little too familiar around the roads. So I think that fair protection has been given. What the extent of that protection may be in the future or how far its scope may be extended is a matter that will have to be dealt with from time to time as circumstances arise.

We have power in all reserves in the prairie country, to make them game reserves and to protect the game. That has been done in quite a number of cases, and we have acted in conjunction with the Provincial Governments which have primary jurisdiction over the game.

Protection from Fire

But the two great things for which the reserve was established are the protection of the timber and, as a consequence, the protection of the water supply. The protection of the timber is the first great question we have to con-

sider, and when I consider the question of protecting the timber on the eastern slope of the Rocky mountains and realize what great danger there is through carelessness and through the very many ways in which fires can be started, it causes me much anxious thought. It is a matter that means very much for the development of that Western country, that that Reserve should be protected and administered in a proper way. Those of us who have the responsibility for its administration feel very keenly that responsibility. The future of the West, in one respect at least, depends on the action that shall be taken now by the administration. I want to point out that the setting apart of a reserve is not the administering of it. You may set apart reserves until you have the whole country covered with them; but unless you provide for their administration in a proper manner, you might as well not have them at all.

That is the question we have to deal with in connection with the Rocky Mountains Reserve, as well as in connection with the other reserves. What is it going to cost to administer a reserve like that in a proper manner? Some person says: "Go to Germany and find out what the proper methods are, and find out what the cost is." We go to Germany and we find out something about the proper methods, and you ask what it costs. We find that it should cost at least a dollar an acre. There are in the Rocky Mountains Forest Reserve 11,456,000 acres. Are we going to adopt the German methods? Is there any use of my going to the Government and asking for an appropriation of $11,000,000 to administer the eastern slope of the Rocky mountains? I hardly think so. I find my modest request this year for an appropriation of one cent an acre, has had to be diminished.

What is it going to cost to administer it? Let us go over to the United States and find out what they are paying; for the United States is perhaps the best model to which we can look, because their conditions are so similar to ours. The conditions of the lumbering industry and of administration there are very much the same as ours. Now, the United States Forest Service are asking for an appropriation of two cents an acre for all their forest reserves, and they have pretty nearly got it. I read just the other day an article complaining very bitterly that they were limited to two cents an acre for the administration of their reserves. I am asking one cent an acre for the administration of the Rocky Mountains Reserve, and, so far, I have not got it.

How are we going to handle the administration? The first

thing we have to find out is where our danger is coming from. There are several sources of danger. There are railways running through the Reserve in different places. Heretofore, we have had to patrol these lines ourselves. I hope that under the legislation which was passed recently at the suggestion of this Commission, the Railway Commission will adopt such regulations as will enable us to be relieved to a very large extent of that expense along the lines of railway. I have no doubt that some inspection will be required by our officers; but, if the regulations are established and provision is made for their enforcement, we ought to be relieved of the actual expense of providing the patrol.

I sometimes get tired talking about things and looking at regulations about things when we cannot get them put into force. They are good, they are all right on paper, but the thing is that you have to translate them into action and put them into effect on the ground. Until you do, the administration is useless, and there is the trouble, my trouble, at any rate. We have the reserves, we talk about administering them and people think we have the administration in proper shape. Presently there is a dry year, fire comes in on us and everybody turns around and says: "Those fellows told us they had this thing all arranged, that they could control the situation and here they are letting things burn up." Unless we get the administration into proper shape now, unless we are prepared to spend the money now and get things into proper shape before that dry year comes, we are bound to have trouble and we will have trouble.

What are we going to do? There is a plan for handling the railway situation if we work it out. Then there is the other question of fires coming in from settlements and from people going into the reserves for pleasure purposes, hunting, fishing, etc., and from industrial operations that may be carried on in there. We have to have an organization that will be effective to handle that situation. During the present summer we have improved the protective system on the Reserve. We have built huts here and there for our men in different districts and we have had these huts supplied with fire-fighting tools of different kinds, so that there would be a supply available at any time a fire happened to occur.

But we have to go on and organize on somewhat different lines. The fire situation in a forest reserve is not very different in many ways from what it is in a city. The two cardinal things in handling a fire in a city are: first, to get word of the fire quickly before it

gets too far ahead, and second, to get help to the scene of the fire quickly. We have to provide those things on the forest reserve just as we have to do in the city. Now, the point is to locate roads and trails, so that our men, in making that patrol, will have the opportunity of seeing the fire in the best possible way. The roads and trails, as laid out for convenience, will frequently go along the bottom of a valley where the men are hidden in the forest and cannot see any distance. The trails for our purposes will probably lead along the ridges and places where men can stand and watch large areas of forest and thus detect the fires quickly. But, after they see the fires, the next thing is to get to them quickly, or get word out for help quickly. That means that there must be a series of trails all through the forest. If any of you have been in the Rocky Mountain country you have seen much of the burnt forest and you know how the windfalls lie piled up, making an impenetrable mass through which it is impossible to make any progress. A man may be two or three miles away and he may have to travel 12 or 15 miles to get to the fire. We must open trails so that the men can get from point to point quickly, and we must open them in the most economical and most effective way. We have to get quick communication and it has been found that one of the greatest possible helps to a fire fighting force is a telephone system through the forest. By telephone, word can be sent out quickly as to the location of the fire, and help can be got into it. We have to develop a system of telephonic communication through our forest reserves before we can have a perfect system of protection. These are some of the main things.

Then, in lumbering operations, the question of the disposal of the débris is an important one. We have made a start in handling it on the Rocky Mountains Reserve—not a pretentious start, because we had not the facilities—but we have made a start toward the disposition of the débris, and, if we can handle that successfully, it will undoubtedly be a useful factor in preventing the spread of fires.

A further question that we have to study, and I have had one of our men studying it this summer on the Rocky Mountains Forest Reserve, is the restoration of the forest after lumbering operations on the eastern slope. We want to try and get our forest back by natural methods if we can; but the following of natural methods means that we must know how natural methods work. They may work all right along the lines we think they will work along, or they may work very different from our theory as to how they ought to

work, and the only way to find out is to investigate on the ground. I would illustrate in this way how we might get into difficulty by going ahead too fast. When you get into the upper valleys in the Rocky mountains, you get into a place where the balsam fir grows easily, and in those places there are spruce and balsam fir mixed. We want to get the spruce to reproduce. We might follow methods of cutting that would mean the reproduction of the balsam fir, which is not so valuable as the spruce, and which would mean the working out of the spruce altogether. So we want to investigate these questions and we have been investigating them, and the young man who has been doing that work is in Ottawa now working up his report.

Senator Edwards: Is the spruce as reproductive as our spruce in the East?

Mr. Campbell: Yes, the spruce reproduces very satisfactorily on the whole; just as well as the spruce here, or better.

The Organization Needed

I shall now discuss the organization with which we shall have to handle this forest reserve. At present, we have an organization which is not at all complete nor adequate for the work required. In fact, we have not had an appropriation during this past year which would enable us to establish such an organization. But, for the coming year, we shall have a better appropriation, although not quite all I asked for.

My idea about the organization of the Reserve is, first, that we should have at the head of it a man whom we might call an inspector and we want a pretty good man, a well-trained man for that purpose, a man who has been trained on the scientific side of the work and on the practical side as well. To find such a man is a somewhat difficult task at the present time, and, looking over the field, I have come to the conclusion, and I propose to recommend, that we secure a man from one of the forest reserves in the Western United States. The forest reserve administration in the United States has advanced very rapidly in the last few years and they have trained a number of men who have had the administration of the fire protection service, the superintendence of lumbering operations and, in fact, all the work required on a forest reserve. These men and these services have made mistakes; they have learned by their mistakes as well as by their successes, and, with an experienced man who has passed through that service, we could avoid many things in which otherwise, we might repeat the mistakes which they made. It seems to

me it would be the part of wisdom for our Government at the present time to take such a man as that, so that we will have the advantage of his experience in the laying out and the carrying on of the work on that Eastern slope.

Administrative Districts

The Rocky Mountains Forest Reserve, as you will see, covers a very extensive area stretching from the International boundary northward for 600 miles. For proper administration, it would have to be broken up into different districts and my proposal is, that we establish a division of the Reserve stretching from the International boundary to the Highwood range, with headquarters about at the Crowsnest line. In charge of that division, we would put a man who has had some scientific training and experience, although he would not require it to the same extent as the Inspector, because the Inspector would be there to assist the man who had had less training and help him to develop along the right lines.

Another division would extend from the Highwood range up almost to the Saskatchewan river, although, of course, the exact divisions would have to be worked out more definitely on the ground, later. Another division would extend from the Saskatchewan river to the Athabaska river, and finally, another division north of the Athabaska river. The men who would be in charge of these divisions should have some scientific training as well as practical knowledge.

Then, coming down further in the administration, we shall need a number of forest rangers who will patrol the different divisions of the Reserve and look after its protection. The forest ranger is a very important officer in the administration of the Reserve. If we get good men who have an interest in their work, men who understand getting around in the bush, men who can take care of themselves when they get out and have to meet circumstances they have not met before, if we get good men of that character, we can handle the situation. The forest ranging staff is, finally, the backbone of the administration, and unless we get the right kind of men we cannot carry it through successfully.

I shall not say anything about the Canadian administration in this respect. When we come to say things about people very particularly, it is always well to draw our illustration from far away. In the administration of the forest reserves of the United States—as I know from talking with the men who have had charge of the ad-

ministration and men who have visited the forest reserves of that country in the early years of the administration—the rangers were chosen in those early years, not because they knew anything about bush ranging, not because they knew how to handle an axe, not because they know how to pack a horse, but because some influential person in the district wanted them to get the job. As a result, they put on the work men who were so old that they simply could not move about. They got on the work men so lazy that they would not move out. They got on the work men who were so independent that they would not take instructions but would do as they liked, and on the forest reserves of the United States they had a forest ranging staff that was utterly ineffective. They changed the system of selecting their men and selected them on the basis, first of their being physically fit, second, of their having some knowledge of bush work and a knowledge of the packing of horses, in cases where they were to be employed in districts like the Rocky Mountains Forest Reserve, and other matters of that kind, which bear particularly on the work they have to do. Then, if these men did not come up to the mark, they could be dismissed. In that way, they have revolutionized the administration of the forest reserves in the United States. I have had the opportunity of visiting some of the reserves there and they have an effective force. The whole machine is working satisfactorily, the men are taking an interest and pride in their work and are trying to do it, not for the purpose of personal gain, but with the object of doing a public service. I certainly would like to see such a force in Canada. The only way in which we can make a success of our forest administration in Canada is by getting that spirit of public service into the administration and having it carried on in that spirit throughout.

In regard to the Rocky Mountains Forest Reserve there are one or two other points that I might mention.

Dr. Bryce: How large a staff will it take?

Mr. Campbell: Of course, the staff we would have at first would be only a small staff, comparatively. We would not attempt to have a staff that would be sufficient to handle the service as it ought to be handled finally. I think we ought to have a fairly large staff of at least a dozen rangers on each division besides the chief officers and, at times, we might have to put on extra men. The administration of the Eastern slope of the Rocky mountains should be handled with one principle running through it—and I speak now of the administration in general, not only the timber, but the coal

mining and the water supply and everything else which affects that Reserve—it ought to be carried out on the principle of making that Reserve as useful as possible to the public and holding it for public purposes as far as that can possibly be done. I am sorry to say that the administration has, to a certain extent, been broken up in a way which, while it may be more effective in some respects, on the whole, makes it a little difficult to follow out the principles all through the administration, that the Reserve would require if it is to be made as effective and as useful as possible.

Mr. Sifton: How much money do you estimate would be required for that work for this year?

Mr. Campbell: I asked for $110,000, but that amount has been reduced.

Mr. Sifton: How much have you set aside for the Rocky Mountains Forest Reserve?

Mr. Campbell: A general reduction was made and I have not distributed it yet. There was a reduction of $40,000 on what I asked for.

Mr. Sifton: For all the reserves?

Mr. Campbell: For the whole appropriation, including tree planting, fire ranging and everything.

Mr. Sifton: How much will that leave you for this reserve?

Mr. Campbell: If we cut it all in proportion it would leave about $80,000 but I have not really readjusted it yet.

RESOLUTIONS

Mr. Sifton: We shall first take up the question of the work of the Committee on Lands with respect to which I understand Dr. Robertson has a resolution to offer. I might just say that last year we asked for $50,000 in addition to our Civil Service vote—of course, you all understand that our staff is provided for by the regular Civil Service vote. The salary of each man is paid in that way except in the case of Dr. Hodgetts and two engineers, who are paid out of the general appropriation. Our appropriation for the last two years has been $50,000. This year we are asking for $65,000. Out of the additional $15,000 we propose to pay for some additional work of which Dr. Robertson has spoken. I wanted to have a resolution on that matter from you so that there should be no doubt about the opinion of the Commission.

Dr. Robertson: I move, seconded by Chancellor Jones—

THAT the Commission approves of the proposal to extend to

all the provinces the investigations into methods of growing alfalfa successfully; and

THAT the Committee on Lands be directed to arrange for carrying out the work in connection therewith.

DR. ROBERTSON: We are growing alfalfa now with the co-operation of the farmers in four provinces with immense acceptability, and it is costing about $700 for each province. This work should be carried on for at least three years.

Motion agreed to.

DR. ROBERTSON moved, seconded by Chancellor Jones—

THAT the Commission approves of the proposal to extend the investigations of the survey of farms by co-operating with a certain number of farmers within the areas covered by the survey, and

THAT some farms in each area be recognized as illustration farms of the survey, and

THAT the Committee on Lands be directed to arrange for carrying out the work in connection therewith.

DR. ROBERTSON: All of this work has been done through the provincial organization. Even our illustration plots are designated by the Provincial Agricultural Colleges, and our surveys of the plots and farms are done through the Provincial Departments or the Colleges, so that we are not competing in any sense. We make use of their services, and co-operate with their own experimental farms.

SENATOR EDWARDS: They are not experimental but illustration farms?

DR. ROBERTSON: Yes.

Motion agreed to.

Senator Edwards moved, seconded by Dr. Fernow:—

THAT the Commission of Conservation approves of the proposal to establish a national laboratory as recommended by the Dominion Public Health Conference.

MR. SIFTON: I have asked to have this resolution passed so that I shall have it in my hands in going before the Government. I have some assurance that the appropriation will be put in and that we will get this done this year.

Motion agreed to.

MR. SIFTON: We have two or three matters in connection with the work of the Committee on Forests to deal with. Perhaps the

most immediately important is the question of having proper regulations prepared by the Railway Commission under the law of last session, which was passed at our request and on account of the agitation carried on by us. Judge Mabee, Chairman of the Railway Commission, is thoroughly in sympathy with our purpose and very desirous of adopting and promulgating regulations which will be effective. We all know how difficult that is to do, not only to get regulations of the wisest and most effective character, but also to have them properly carried out. I have had conversations with Judge Mabee on two or three occasions, and I suggested to him that, when the regulations were adopted, it would be essential for the Railway Commission to appoint an officer of rather high rank and professional qualifications as Chief Fire Inspector for the Dominion.

Senator Edwards: That is my view exactly.

Mr. Sifton: I am quite sure that any other course would be entirely ineffective. It would be necessary for the Commission to have a man of high professional standing and capacity and, under him, the inspectors for the different sections of the railways. I am quite sure that Judge Mabee is willing to adopt that course and that he has the strongest possible desire to achieve the object we have in view. But I think he needs help. I do not think there is a man in the Dominion, except the Prime Minister, who has so many things for his determination as Judge Mabee, or who has so many grievences to consider from people, each of whom expects his to be redressed at once. We must be practical in these things and endeavour to do our share.

I think it is our share to furnish men to co-operate with him and help him to work these regulations out. I wish to suggest that Dr. Fernow be especially the representative of the Commission in helping to work out the regulations. As Chairman of the Committee of the Canadian Forestry Association, he has already prepared a report on this very subject, and we have the benefit of that and of the fact that he will be able to give the time and attention necessary to work it out; that his mind is running upon that subject and that he has for years made a special study of it. I am quite satisfied that Judge Mabee would be only too delighted to feel that he will have the support and assistance of a gentleman of Dr. Fernow's experience in such matters. In addition to that, I think it would be well if it were understood that the Chairman of the Forestry Committee, Senator Edwards, and Dr. Fernow and myself would

especially press upon the Chairman of the Railway Commission the necessity for the appointment of a Chief Inspector and a staff to see to the enforcement of the regulations. Dr. Fernow and I discussed it to-day, and we thought that, if we would get these things done,—and I think we are in sight of getting them done,—if we could get effective regulations and inspection for the prevention of fire on the railways of the Dominion, then, if this Commission had never done anything else, it would have amply justified its existence and its work for the last two or three years.

I would therefore, suggest that we appoint Dr. Fernow as the special representative of the Commission to co-operate with Judge Mabee in the drafting of the regulations, and that it be understood that Senator Edwards, Dr. Fernow and myself should act as a general committee to further the general purposes of the work in connection with the Railway Commission.

Dr. Bryce: I have great pleasure in moving, seconded by Mr. McCool—

THAT Dr. Fernow be appointed as the special representative of the Commission of Conservation to co-operate with Hon. Judge Mabee, Chairman of the Railway Commission, in the drafting of regulations, under the Act requiring railways to protect forests through which they pass, from fire, and

THAT Hon. Senator Edwards, Dr. Fernow and the Chairman of the Commission, be a Committee to further the general purposes of the work in connection with the Railway Commission.

Motion agreed to.

Mr. Sifton: Is there any possibility of helping Mr. Campbell in connection with the appropriation for this Rocky Mountains Forest Reserve? I understand from him that he has asked for about $110,000, and that the amount he is likely to get will be about $80,000. It is quite possible that if this matter were represented to the Government a little more strongly it might be willing to increase the amount. I do not know how you feel about it, but, for myself, I do not think the Government is spending money for any purpose that is more important than that; and it seems to me that this is one of the occasions when we can come into contact with the Government for the benefit of the public. I would like to get your views on this matter, because if it is possible to assist the Dominion Forestry Branch, I think we ought to do it.

Mr. Davison: I think in a country like that in the Reserve, the matter of trails must be of very great importance, particularly

within the first two or three years, so that they will be available while railway construction is going on. I think there should be a very liberal appropriation for the first year.

DR. FERNOW: Has Mr. Campbell made out any detailed estimates as to the various kinds of work he has to do?

MR. CAMPBELL: Yes.

DR. FERNOW: Respecting the amount of trail work, the mileage of telephone lines required and the organization necessary, it seems to me it would be much better to be left alone entirely if it is not done so as to be effective, because it would reflect on future appropriations. It is sometimes better not to spend any money at all than to spend too liberally.

MR. CAMPBELL: I prepared the estimate on the basis of the different classes of work we had to do, trail cutting, telephone lines, and other requirements and also provided for the proper staff for carrying out the work. I got that down as closely in detail as I could, and then, from that, calculated the amount for which I asked.

SENATOR EDWARDS: Would you expect that amount every year, or is that only for the inception of the work?

MR. CAMPBELL: We would have to go on with the same amount every year.

SENATOR EDWARDS: You would not have the telephone system to establish after the first year, and would not your appropriation on that account be larger for the first year?

MR. CAMPBELL: I asked all I saw any chance of getting. There is this further consideration; that, even if we get an appropriation, if we do not get the right kind of staff, it is useless. I am a little afraid of too big an appropriation just at the present moment, but I would like enough. What I mean is: that, unless we develop a staff which will handle an appropriation properly, a staff of men who understand what to do and who will do it effectively and economically, we shall not get the real good we ought to out of that appropriation.

DR. BRYCE: It seems to me that this is a very important matter, and, as a Western man, I have taken a great interest in it. I think the right way would be to appoint a committee to go and wait on the Minister. That is the usual way of doing these things, and I would suggest that a committee, perhaps the same committee that we appointed to co-operate with Judge Mabee, should go and bring the matter before the Government in the name of the Commission.

Mr. Sifton: I do not see any special object in having a Committee. Hon. Mr. Rogers knows all about it. It is simply a question of our deciding whether we feel disposed to recommend that the amount be increased. If we do, I think we can get it done.

Senator Edwards: Mr. Campbell understands this matter a great deal better than I do; but I do not feel that there is any great danger of not being able to spend this money properly in trails, telephone lines, etc. It seems to me that, if you will require $110,000 in a few years, you require double that amount this year. Whatever difficulties there may be in organizing a staff afterwards, you can surely get a staff to build trails and telephone lines. I think it is absolutely safe to recommend a vote of $110,000 and I think we should do it.

Dr. Fernow: I think that is perhaps the difficulty that Mr. Campbell has in mind. Sometimes when you have money to spend, there are ways of spending it that are not desired. I agree with Senator Edwards that $220,000 would not be too much, and therefore if we use our influence to secure this $110,000, it would not be too much.

Senator Edwards: Is there any objection to strengthening your hand in regard to this matter in asking for the $110,000, Mr. Campbell?

Mr. Campbell: Not at all. I laid out what work I thought we could undertake this year and I asked for just enough to cover that.

Senator Edwards: You had better have it.

Senator Edwards moved, seconded by Dr. Bryce—

THAT, in view of the enormous importance of this object the Commission of Conservation recommends that an appropriation of not less than $110,000 be provided for forest protection in the Rocky Mountains Forest Reserve during the fiscal year, 1912-13.

Motion agreed to.

Mr. Sifton: There are several matters coming under the jurisdiction of the Public Health Committee that are mentioned in the précis and respecting which it is not necessary to have any resolution. We have, however, one proposition of a somewhat different character. Some gentlemen who are more or less connected with the institutions for the treatment of tuberculosis are extremely desirous that a Commission should be formed to make a study of the present situation and work out a plan which would be an improve-

ment on the present method of grappling with the question of tuberculosis, not so much in regard to the general question of organization, as to the co-operating of different institutions so as to get the best scientific treatment. Their view is that, at present, the work is too sporadic, too erratic, too diffused. There is a lack of organization and concerted effort and there is no way in which the knowledge of tuberculosis, which is available, can be brought into actual play for the work being done throughout Canada.

I have had some correspondence with the Dean of the Faculty of Medicine of Toronto University, and with some gentlemen who did not desire to have their names put forward publicly as conducting any agitation in favour of the proposition. They think that, if the Commission of Conservation would take a hand in the matter by agreeing to appoint one or two men on such a tuberculosis commission, the Province of Ontario would be likely to appoint one also, and probably, the city of Toronto, through its Health Department. I felt that, while I was not prepared to give a positive opinion, it was quite likely that if it was thought we could serve any public purpose we might very well take action. What do you think?

Mr. McCool: I think we are all quite agreeable and I would move seconded by Professor Robertson—

THAT Dr. J. G. Adami, of McGill University, be nominated to act as the representative of the Commission of Conservation, in conjunction with representatives of the Province of Ontario and the city of Toronto, on a Commission to secure a more complete organization of agencies for the suppression of tuberculosis.

Motion agreed to.

Mr. Sifton: I have a letter which I think ought to be mentioned, although perhaps it is more or less of a routine nature. It is from the Civic Guild of Toronto, a body of gentlemen who are doing a good deal to promote improvements in town planning, and who are interested in the housing question. Dr. Hodgetts has made a special study of that question for several months and we will hear from him on it to-night. The Civic Guild wrote saying that they are likely to appear before the Ontario Legislature to ask for some amendment to the law, and they ask for our support. In reply, I said that our Medical Adviser had been giving the subject a good deal of attention and that we would undoubtedly be in a position to support any legislation which would provide for the improvement of housing conditions; but I was not definitely prepared to say what

proposition we would be prepared to support as yet, because I did not know what they were proposing to do.

One thing that is perfectly clear, although I do not at all profess to be an expert on the question or to have expert knowledge in connection with the history of the housing question, is that much of the legislation that has been passed has done much more harm than good, because it has been misdirected, and it does not follow that because people ask for legislation, the legislation is wisely thought out. The subject requires careful consideration before we commit ourselves; but I think we might go so far as to say that the Commission will approve of our Public Health Committee supporting a demand for legislation after satisfying itself as to the wisdom of the provisions that are being asked for. I did not feel that a Committee of the Commission would be justified in going before a legislative body as representing the Commission of Conservation without direct authority to do it, and I am bringing it before you so that you might give authority if you see fit.

Senator Edwards: There is no harm in the suggestion of the Chairman, that the Committee on Public Health investigate, and, if it is satisfied, approve of the proposal.

Mr. Sifton: You would be satisfied to have the Public Health Committee represent us in any question of that kind that might arise?

Senator Edwards: I would move, seconded by Mr. Davison,—

THAT the Committee on Public Health represent the Commission on any question that may arise respecting housing conditions and town planning.

Motion agreed to.

Mr. Sifton: You will remember that this morning I read a memorandum on the subject of peat. A new government is in power and the Minister may not have the opportunity to study the question or get any information for a year. He is busy with other things and, of course, he cannot have studied this question as we have. It would be well for us to express ourselves strongly on the subject.

Senator Edwards: It is really practically determined that this peat can be produced, there need be no question about the value of it?

Mr. Sifton: Not a bit in the world. They produce power for not more than two-thirds of what it costs when burning coal, rather less than that, and they have produced fuel for stoves and grates

which is of excellent quality. I cannot imagine anything that will be a greater boon to the community in general than the develoment of this fuel, which seems to be on the point of successful development. Until four or five years ago it had never been economically produced in this country.

SENATOR EDWARDS: What is the nature of the recommendation you wish for?

MR. SIFTON: I think what we ought to do is to place on record our appreciation, from the standpoint of conservation, of what has been done, and I would say that we ought to suggest to the Government that any further investigations along the same line that are recommended ought to be pushed forward, and that the money for them will be very well spent. If you approve of my view the Secretary will put the motion in proper form.

DR. JONES: I have much pleasure in moving that the Commission take action on lines suggested by the Chairman. I would move, seconded by Senator Edwards,—

THAT the Commission of Conservation approves of the investigation that has been carried on by the Mines Branch of the Department of Mines in connection with the commercial use of peat, and suggests that further investigations and experiments be made with a view to making the proposition still more attractive to the people.

The Commission also places on record its appreciation of the work of investigation that has been done.

Motion agreed to.

MR. SIFTON: I have here a formal motion placing the ex-officio members of the Commission on the same Committees as their predecessors.

It was moved by Dr. Robertson and seconded by Dr. Bryce—

THAT WHEREAS, since the last meeting of the Commission, the Honourable Martin Burrell has succeeded the Honourable Sydney Fisher as Minister of Agriculture, the Honourable Robert Rogers has succeeded the Honourable Frank Oliver as Minister of the Interior, the Honourable W. B. Nantel, has succeeded the Honourable William Templeman as Minister of Inland Revenue and of Mines, the Honourable O. T. Daniels has succeeded the Honourable A. K. Maclean as Attorney General of Nova Scotia, the Honourable J. A. Mathieson has succeeded the Honourable F. L. Haszard as Prime Minister of Prince Edward Island, the Honour-

able J. K. Flemming has succeeded the Honourable W. C. H. Grimmer as Surveyor General of New Brunswick, and the Honourable W. H. Hearst has succeeded the Honourable Frank Cochrane as Minister of Lands, Forests and Mines of Ontario.

THEREFORE, be it resolved that these gentlemen replace their predecessors on the Committees of the Commission of Conservation of which the latter were members.

Motion agreed to.

Mr. Sifton: We have never succeeded in making much of a success of our Committee on Fisheries. It has met a couple of times; but our main trouble was that the gentleman who was appointed Chairman of the Committee, who is a very capable man and would have fulfilled the duties if he had had time, was so far away and so much occupied that he could not devote the necessary time to the work of the Committee. Mr. Haszard, living in Prince Edward Island, could not readily communicate with the other members of the Committee, and when a question came up he felt a little delicate about taking a definite position. I would suggest that Dr. Jones should take the chairmanship of this Committee, and I am sure that would be acceptable to you. He could do very important work in co-operation with the officers of the Department of Marine and Fisheries.

There is not a subject more prolific of good results if a little attention is given to it, because we can get great reforms. There is material for valuable work for the Commission lying all around on that subject. Most of us have read Mr. Patton's very capable report on the Oyster Fishery which has attracted very widespread attention indeed, and I have no doubt that by following out something definite in that way, taking up the different branches and seeing what can be done, important practical results can be brought about. The Committee needs a Chairman who will be able to give a little time to it, and I am satisfied that Dr. Jones will do it very acceptably if he will accept the position. What do you say Dr. Jones?

Dr. Jones: I can only say that I know very little about fisheries or fishery questions.

Mr. Sifton: You have an open mind.

Dr. Jones: Not only an open mind, but almost a vacant mind. I shall be very glad to make the experiment for a year, and, if I do not accomplish anything, I suppose someone else

could take the matter up. I am almost as far from Ottawa as Mr. Haszard was and, in that respect, I am almost as much out of touch with the other members of the Executive; but, if anything can be done to better the situation, I will be very glad to attempt it.

It was moved by Rev. Dr. Bryce, seconded by Dr. Robertson—

THAT WHEREAS, since the last meeting of the Commission, Hon. F. L. Haszard has resigned as a member of the Commission, Dr. C. C. Jones be appointed Chairman of the Committee on Fisheries, Game and Fur-bearing Animals.

Motion agreed to.

Mr. Sifton: Mr. Monk, Chairman of the Committee on Water-powers, gave a good deal of attention to the subject and the work he did was of great service. Now he is Minister of Public Works, and we have to appoint a successor as Chairman of the Committee. I would like to see Dr. Béland in that position.

It was moved by Mr. McCool, seconded by Mr. Mackay—

THAT WHEREAS since the last meeting of the Commission, the Honourable F. D. Monk has resigned as a member of the Commission, Dr. Béland be appointed Chairman of the Committee on Waters and Water-powers.

Motion agreed to.

Dr. Béland: My position is about that of Dr. Jones, I have no special knowledge of the subject in question.

Senator Edwards: That is better than a man with special interests.

Mr. Sifton: There are two new appointees to the Commission, Mr. Gohier and Mgr. Choquette. It is desirable to put them on the same Committees as their predecessors.

Dr. Robertson: I would like Mgr. Choquette on the Committee on Lands also.

It was moved by Mr. Mackay, seconded by Dr. Fernow—

THAT Mr. Edward Gohier be a member of the Committee on Lands.

Motion agreed to.

It was moved by Senator Edwards and seconded by Mr. McCool—

THAT Mgr. C. P. Choquette be a member of the Committee on Minerals and of the Committee on Lands.

Motion agreed to.

Dr. Jones: The Committee on Fisheries seems rather smaller than the others, and I would like to ask that Dr. Robertson be appointed a member. I would move, with Mr. Davison as seconder—

THAT Dr. Robertson be a member of the Committee on Fisheries, Game and Fur-bearing Animals.

Motion agreed to.

Mr. Sifton: I think, Mr. Mackay, that we ought to be able to issue some kind of a regular bulletin. Something of the kind has been done; that is to say the officials have issued bulletins from time to time, but not regularly, and it has not been systematically done. I think we probably have reached the period when we could advantageously issue a press bulletin periodically, perhaps once a month during eight months of the year, leaving out the four summer months. It requires a good deal of consideration and I would suggest to you, Mr. Mackay, as Chairman of the Press Committee, that you should think the matter out.

Mr. Mackay: I think the idea is a capital one; the only possible criticism of us that could be made is that we have not used printer's ink enough. The Commission's reports are splendid things, the books issued are beyond criticism; but the small stuff that gets into the hands of the country editor and which he places before his readers is, after all, the vital thing in getting conservation into the minds and hearts of the people, and any outlay that will make it easier for the country editor to disseminate widely the principles and policies for which the Commission of Conservation stands, will be money well spent. The suggestion made by the Chairman is a new one to me; but I think it will work out very advantageously. It will, as you say, involve quite a lot of work and I know the staff has been overworked. For that reason we have not been pushing them as we otherwise would have done, for more printed matter. I took the matter up with the Canadian Press Association and found the members more than willing, in fact, very anxious, to get this kind of matter, matter dealing with the resources in short, crisp form and in an authentic way.

Mr. Sifton: For instance, hardly anybody knows the exact position in regard to Niagara power and everybody would be interested in knowing just what there is there.

Mr. Mackay: And that is in the Water-power report by Mr. Denis and Mr. A. V. White.

Mr. Sifton: That is the only comprehensive report.

Mr. Mackay: It is in a bound volume. If that portion were published in bulletin form, it would be very much more generally read. If it were stated that, whereas we expected 5,000,000 horse-power at Niagara and we have only a little over 1,000,000, such a statement would get into half the newspapers of the country.

I want to compliment Mr. Patton on the work he has done. He has done splendid work and a lot of it in the time he has been in our service.

Mr. Davison: I think we ought all to express our admiration of the publications that have been issued this year. Everyone who has seen them has enjoyed them, in every department of life. I have seen bankers interested in matters in which they were never interested before. I find people want to get hold of our publications. I am sure that the best of results may be expected from the continuation of the work of the Press Committee.

Dr. Bryce: As a member of the Press Committee I would strongly favour this suggestion. I would like to express appreciation of the volumes published. The Water-powers report was well done; it had a good appearance and everything about it was good. It is now proposed to extend this work. As the Chairman of the Committee says, people do not read books very much and they may never see this. If it were drawn to their attention in bulletin form, it would get into the newspapers and go all over the Dominion. Speaking especially for the West, I know the papers are anxious to get all this material. Books are not as numerous there as they ought to be. If the members of the Committee find it practicable to do this, I would strongly approve of the suggestion.

Mr. Sifton: It would not cost very much.

Mr. Mackay: I think from the standpoint of the Public Health Committee alone there is an abundance of material to-day which, if it can be got into the press, would more than justify the existence of the publication. I do not know how Dr. Hodgetts would regard that; but I think it would constitute a valuable agency in carrying on a persistent campaign in regard to cleanliness, and tuberculosis and other subjects. We could deal with facts which the average newspaper man cannot get at. He is anxious to publish these facts but has not the exact scientific information at hand, especially in condensed form.

Mr. Sifton: It seems to be the general view that this plan should be carried out.

The meeting then adjourned.

Evening Session

The Commission resumed at eight o'clock in the Lecture Room of the Normal School, the Chairman, Hon. Clifford Sifton, presiding.

Mr. Sifton said:—

Ladies and Gentlemen:

We have met this evening for the purpose of hearing two addresses, one by Dr. Robertson in regard to the work of the Committee on Lands, a section of the Commission of Conservation; the other by Dr. Hodgetts, the Medical Adviser of the Commission, who will deal with the housing problem in Canada, and, I believe, will give us the result of observations he has made in some other countries upon the same subject. I have much pleasure in introducing Dr. Robertson.

The following is Dr. Robertson's address:

Improving Canadian Agriculture

By

Dr. James W. Robertson,

Chairman, Committee on Lands, Commission of Conservation

Mr. Chairman, Ladies and Gentlemen:

My theme to-night is not one that appeals directly to those who dwell in towns and cities, although their welfare depends to a very large extent upon the weal and progress of the people who live on farms. Last year the farmers of Canada produced field crops worth $565,000,000. That amount can be doubled in ten years if all farmers will adopt the systems and methods followed on the best 10 per cent. of the farms examined last year for the Commission of Conservation. What are we going to do about it? That is my theme.

Let me repeat that proposition. The field crops in Canada last year had a value, at the places of production, of $565,000,000. This amount could be doubled in ten years if all the farmers would adopt and follow the systems and methods that were followed on the best 10 per cent. of the 1,212 farms examined for the Commission of Conservation. What are we going to do about it? That is the question which the Committee on Lands is trying to deal with. It is a question of conservation: conservation of fertility, of labour, of health, and of prosperity. Agriculture is not only an occupation which some individuals follow for profit: it is a great national interest, determining in a dominant way the fortunes of this nation and the opportunities and the character of the population. So, while this matter primarily concerns the farmer and his family, it affects the status of Canada, its outlook and its destiny. This question of how we take care of old Mother Earth to make her a better home, or a poorer home, for the portion of the race that lives within our borders, opens a big field for thought and for action.

Educational Agencies

One must recognize the agencies that have brought into existence this large volume of wealth. The credit is due first under the blessings of Providence, to the farmers themselves and their families. A good many agencies co-operate with them to help them in their work. Organized government in Canada does very much. Under the Federal Government

we have the experimental farms all the while shedding new light upon difficult problems. We have the various branches of the Dominion Department of Agriculture, the Live Stock Branch, the Dairy and Cold Storage Branch, the Seed Commissioner's Branch and various divisions which furnish information of real value to those men who toil in the fields for the uplift and the prosperity of Canada. Then, under the Provincial Governments the agencies that help are manifold. To even mention them would consume minutes and, without explanations, would not make at all clear the kind of work they do. There are agricultural colleges with all their extension work; there are resident and travelling inspectors and instructors. Ontario alone employs now at least a hundred trained, skilled, competent men, travelling over the Province to furnish information and advice, to shed light into the homes of even the remote farmers. Then there is the agricultural press which does a great deal and does it very well. In those regards, Canada is in the front rank among all the nations of which I have any knowledge. Then we have voluntary and state-aided associations doing very valuable and comprehensive work. Let me instance one in passing. I shall not detain you by details, otherwise I should take more time than I am willing to consume to-night.

We all like to have good names for ourselves and any one who heightens the reputation of his nation, who strengthens the confidence of the people in their own country and its possibilities, does fine service. It is a good thing when anyone does any bit of work that helps to establish the people's good opinion of their own nation. You know a boy will live up to discerning praise and he will shrink down to unmerited blame. Even grown men are strengthened or weakened in the same way. It is a good thing for the farmer to have occasionally a chance to straighten himself and say: "I belong to the fellows who do that for Canada." There was a great Back-to-the-Land exhibition in New York city last autumn when the Commission on Industrial Training and Technical Education, of which I am Chairman, was there. We went to that Exhibition as the guests of those in charge. Two events stood out in the results and were heralded all over the Continent and cabled to Europe. What were they? Not the gate receipts nor the fashionable turnouts of those who were there, but that the $1,000 prize in gold—the gold gave just the glisten to the prize, that made the 'thousand-dollar-prize-in-gold' appeal to the newspaper correspondents, when $1,000 of gain in a common transaction would not be anybody's concern—the $1,000 prize in gold, for the best bushel of wheat grown anywhere on the

Continent, at the Exhibition held in New York under the auspices of American citizens, with judging by American experts, was won by a Canadian, Mr. Seager Wheeler, of Rosthern, Saskatchewan. Then there was a $1,000 prize in gold for the best collection of potatoes and that prize was won by a Canadian in British Columbia. What are the two big staples that form the food of civilized nations? Bread and potatoes; and of both these great staples the quality was best in the Canadian samples.

Some eight or nine years ago, there was formed the Canadian Seed Growers' Association, a voluntary association to help the farmers to improve the quality of life in their seed. One of these prize winners was a member of the Canadian Seed Growers' Association; the other was associated with its work, and both gratefully acknowledge that the information and help they got from that Association assisted them to so improve their products that they captured two $1,000 prizes for Canada.

We are doing reasonably well in all these activities either administered by the Government, promoted by the Government, assisted by the Government or carried on by the people themselves. But what of the morrow? Watchman, not what of the night, but what of the day? One of our best watchmen on the tower is Mr. C. C. James, the Deputy Minister of Agriculture for the Province of Ontario. Here is what he says: "Ontario has entered upon a great upward movement in its agriculture." If they can have the work they are already carrying on extended, the crops of Ontario will be doubled in value in ten years. That is the answer of this clear-visioned watchman on the tower. In Ontario, field crops last year were worth $193,000,000, and if there were $193,000,000 more of wealth coined into existence out of chaos, not transferred from one pocket into another, but called into existence by intelligent labour, out of otherwise chaos, indifference, want of knowledge, want of ability, want of application, waste of sun power and failure to use the seed power that is all about us, what an enriching gain to us it would be. If the crops of the whole Northwest last year—Manitoba, Saskatchewan and Alberta—had been a complete failure, so that nothing grew, what a depression would have come over Canada, what a measure of dearth and starvation would have crossed that part of our inheritance. That hints at the effect on our national life of $228,000,000 of value from crops being here, or not here. The doubling of the crops of Ontario would be an addition to the value of the crops of Canada almost as great as the addition of the crops of those three great provinces has been.

Crop Yields

We are making progress. The Agricultural Survey of 1,212 farms in our nine Provinces brought this out. Taking the hundred farms in Nova Scotia, 49 per cent. of the farmers reported an increase in the yield of crops as compared with ten years ago. That is very good; they are not on the down grade in Nova Scotia. In Prince Edward Island, there was a decided decrease from the original productiveness until about fifteen or eighteen years ago; but since then, since they began to adopt the systems and methods that these best 10 per cent. of the farmers I have mentioned employed, there has been a decided increase; and 51 per cent. of the farmers report an increase as against ten years ago. In New Brunswick, 24 per cent. report an increase; in Quebec, 39 per cent.; in Ontario, 24 per cent. and in Manitoba, not one farmer. Consider that report from a virgin province with the accumulated wealth of 50,000 years of the Creator's deposits in that savings bank of soil: that not one farmer on a hundred farms has reported any increase over ten years ago, and 46 per cent. of them have reported a decided decrease. That gives us much food for thought. It brings out a grave situation for consideration. It is to me much more imminent of blessing, or disaster, than any other material question now before the West.

Increasing the Yield in England

Let me give you from another source, another plate of food for thought. As some of you know I have recently been travelling a bit. We have been living in our trunks for a year and a half with the Commission on Industrial Training and Technical Education, going over Canada, part of the United States and five countries in Europe, with our eyes and ears wide open learning a good deal. I will first take one historical illustration from that old land, spoken of sometimes by the buoyant and boisterous Canadian without an accent of noticeable respect, as old, moss-covered, stick-in-the-rut England. I do not admire the harshness of some of the adjectives I have heard lusty, self-confident young Canadians use. Four hundred years ago when the fields of England were, in regard to their exhaustion by farming, about where the fields of Manitoba now are, the yield of wheat, as far as records show, was about 26 bushels to the acre. After two hundred years, some records show that it had gone down, some say, to 8 or 10 bushels to the acre. During the last fifty years, it has been from 30 bushels to 40 bushels to the acre, after more than four hundred years of cropping.

What brought about the change? Chiefly rotation of crops—

putting the right crop in the right place in the rotation, putting a nitrogen-gathering crop like clover or beans in between the grain crops. Side by side on the same farm for thirty-two years in succession, the systematic rotation of crops gave 114 per cent. larger yield of wheat than the non-rotation, that is, the successive cropping by cereals. That is worth thinking about. Are we able to learn the lesson that that teaches? How did it come about? The landlords of England and Scotland were men of wide intelligence. They used to be the real landlords, when they were lords of the land discharging the duties of lordship; and you will find that clauses were inscribed in the leases to govern the system of farming to be followed by the farmers in England and in Scotland. There was a system of rotation to protect the fertility of the land or the lease would lapse and the tenant would be put out. So this dominating intelligence insured a rotation of crops. I would not bring that state of rural society to Canada even if I could; but cannot we somehow get the farmer to inscribe for himself in his system of farm management a suitable rotation of crops? Cannot we get the farmer to be a better guide and governor for himself than any far-off landlord could be or would be?

The Commission's Field of Work

The field of work for this Commission is there. Its place of service in investigation is to see how those farmers can so manage their own business, and administer this great public interest for the nation as a whole, that it shall be helpful, and not hurtful, to themselves and their families and to the land and to the nation as a whole.

In that field we do not encroach on the office of anybody. Experimental farms furnish information after they have carried on scientific research. They publish immensely valuable bulletins, they send out speakers, they give much information. But no other organized agency, so far, has entered on this field of enquiry for service: how can those farmers help themselves and help each other more than they have done; how can the results from the experiences of the most successful become the common possession of all; how can the best systems and methods on the best farms become common on all?

We have begun an investigation of local conditions and the causes which produced them. We have had competent men go to the farms to obtain information as to the actual conditions. These reveal the necessity for improvement. Many of the best farmers attribute their progress and their improvements to the help obtained

from experimental farms, agricultural colleges, farmers' institutes, lectures and agricultural papers. They recognize and admit at once that they get great help in that way. We are investigating, with their hearty co-operation, some of the causes for improvement, some of the causes for standing still and some of the causes for going back. Our work is scientific research, not in the laboratory, but out in the rural community, as to what is occurring and what might occur, to give better results.

In our survey of these 1,212 farms, we omitted a great deal, and I shall omit far more to-night; otherwise I would keep you here till morning. We left out all references to live stock; not because it was not important, but because we were not ready to take in the whole field at first. We did not deal with drainage because we were not sure that we would get much information of real value at first. We confined ourselves to matters that were imminent of danger or big with possible gains. Every farmer, with only few exceptions in the 1,212—and I suppose the exceptions were those who had got out of bed on the wrong side that morning, or had had a bad dream, or had not praised their wives enough the day before, or had somehow been put into a grumpy mood—willingly joined the collector of information, told what he was doing and what the conditions of his farm were. The attitude of mind was full of hospitality, as the homes themselves were, for the men who acted for the Commission.

Functions of the Farmer

At his best, the farmer is a man in partnership with the Almighty. That is farming at its best, gathering sun power through living plants. Farming is the marriage of the strength of old Father Sun to the inherent strength of old Mother Earth. The plant is the child and the farmer manages the business. That is his place in the economy of nature. So this is a noble calling at its best, and those 10 per cent. of the farmers belonged to that sort of fellows. It is a good thing for a nation to have as many of that sort of fellow as you can get within its borders. He is not a "hay-seed," and he is not a "clod-hopper"; he is not anything except a partner of the Almighty to make a new earth wherein dwelleth righteous farming and righteous living. It is a good thing to meet a man like that. He gives one an impression of stability, of responsibility, of majesty. There is no vain bragging or "showy side" in his bearing; it would not become him, because he is a partner, a working partner, with the Almighty. At his middling best he is not the same sort of fellow. Any man who proves untrue to his principles or obligations must deteriorate; he cannot

help it and he cannot hide it. At his worst,—well, this is what those kindly men report when they see somebody at his worst in farming: "Carelessness, neglect and general shiftlessness were evident on many farms." I have reasonably large capacity for believing, but when a man is so conducting his affairs that "carelessness and neglect and general shiftlessness are evident" about his place, I cannot believe he is in partnership with the Almighty. He may have been in his babyhood and boyhood, but the business connection was not kept up.

Why did we gather all this information? Of what use is the large stack of records of these 1,212 farms? For myself, I object to being a collector of information that will be useful chiefly to the archivist two hundred years after I am dead. I have no ambition to accumulate material that the historian only will find instructive and interesting. How can that information be made effective? That is our next enquiry. How can the information collected be turned to good account now—now in the Springtime of our nation's life? How can it be sent out like good seed to bring a crop of intelligence and ability and good will to every farmer in Canada?

Rotation of Crops

I shall detain you a moment with a few of the salient points of the information collected. First, we enquired whether the farmer followed any system of rotation in his crops. Most things hang together. There is a hang-together-ness in this world that it takes a fellow a while to believe in as a working scheme of life; and when he comes to believe in the hang-together-ness of things, he gets a new vision, a new principle, a new guide for his behaviour and he realizes that he is one of the lot. No man liveth unto himself; he belongs to the other fellows as well as to himself. He cannot help it that he is part of them; and their uplift will uplift him and their down-going will pull him down.

If there is a systematic rotation of crops, if the crop that now is prepares the soil for the crop that is to be, then you have continuously improving conditions and continuously improving crops; but, if the crop that now is, does *not* prepare the soil for the crop that is to be, then you get gradual degradation and poverty. No doubt the same principle applies to the rotation of civilizations, and social conditions and opportunities. The generation of to-day must provide cleaner fields with fewer weeds, less disease and more fertility? On the whole, we are on the up-grade, but we may slip back. That is why I connect the rotation of crops with the hang-

together-ness of things on the farm. A good system of rotation provides for the spreading of the labour of the farmer over most of the year. The other system means a rush of work and very long hours for two months in spring and two in harvest, and little satisfying occupation during other parts of the year. I have never known a healthy man who, under sixty, could loaf for half the year and escape the devil. I do not mean the devil hereafter, but the devil here and now. A man has to be at something, something with a definite purpose that calls out his powers, or he will not be happy. Where the practicable system of farming does not provide satisfying, profit-leaving work during the winters, let us have what the Swiss have, what the Swedes and Norwegians have: the home industries—not for profits, but for the salvation of the boys and young men and the satisfaction of the women. Labour, intelligent labour, intelligent skilful labour, labour with good will, is the means of grace, whereby the race will be always rising, rising, rising.

Then the systematic rotation of crops cleans the land, gives a variety of products, increases the yields per acre and leaves the place fertile and clean. That is the acme of all culture on land and in life, fertility and beauty. This is the general conclusion gathered from these farms; that, where a systematic rotation of crops has prevailed, there has been from two to three times the profit to the farmer and a conservation of fertility. That is the general conclusion of the whole matter.

Let me mention a few of the facts in between the ends of that general conclusion. I shall take first the provinces east of the Great lakes, where a systematic rotation of crops is practicable under the conditions of climate, labour and market. In Nova Scotia, only 8 per cent. of the farmers followed any systematic rotation of crops; in Prince Edward Island, 4 per cent. on a small part of the farm; in New Brunswick, 13 per cent.; in Quebec, only 4 per cent. and in Ontario, 53 per cent. Does that not tell a tale worthy of study?

In New Brunswick—so reads the record—"Few follow any systematic rotation, and then, on only part of the farm. Where a four or five year rotation is followed the results are far ahead in every respect."

In Nova Scotia (I shall not go into all the counties) in Pictou county, systematic rotation is not followed at all. In Antigonish, it has just been adopted by a few farmers and other farmers are intending to start. Wherever followed, the results are from two to three times more feed.

In Quebec, in the county of Bellechasse, farmers acknowledge the value of systematic rotation but make no practice of it. In L'Assomption, few follow any system. In Brome, rotation is the practice on a few farms. In Pontiac, very little rotation is followed and weeds are getting very bad. In Huntingdon county, rotation is quite general. Any man who knows Quebec needs no reminder of the difference between the conditions in Huntingdon county and in some other places where there is no systematic rotation.

In Ontario, in Dundas county, a percentage of the farmers hardly know what is meant by the term systematic rotation. In Lanark county, most of the farmers follow some rotation. In Ontario county, a few follow a rather irregular rotation and some, a definite systematic rotation. In Waterloo, few follow a systematic rotation, though many have some definite rotation. What is the difference? The systematic rotation is the one that brings the crop in the right order of sequence. The systematic rotation always has the crops in right sequence for the locality, for fertility and for cleaning the land. In Norfolk county, it is quite general. If this were general all over Ontario we would have Professor James' anticipation realized, and the farm crops of the Province twice as large as they are.

Seed Selection

Another question investigated was the systematic selection of seed. Here again I must be quite brief. The practice of selecting good seed for sowing on the fields is one that reaches away back beyond all records. The Seed Branch of the Department of Agriculture has done much to awaken an interest in this question of good seed—*good* seed, not merely seed that looks plump, but seed suited to the locality and the markets, with a vigorous quality of life. I have no intention of discussing that at length—the quality of life. The dominating thing worth while in any existence that is vital, is the quality of life, not the mere possession of life—the quality that is vigorous to overcome obstacles in a reluctant soil and a dry or wet season and hardy to resist disease. Some strains of seed produce plants which have power to resist attacks of such diseases as rust and are so vigorous as to produce largely. In every strain of seed the farmer must see to the cleanness and vitality. A good many farmers are selecting their seed by choosing the best part of a crop in the field, storing that by itself, cleaning it thoroughly and sowing it. They report good results. That is good. It is still better to prepare a seed-grain plot or field and grow a special crop for the sake of the seed.

Some time ago we arranged a competition for boys and girls on 1,400 farms in Canada to pick out the big heads from the vigorous plants of wheat and oats on the farms. The seeds from these were sown on specially prepared seed-grain plots. The system was applied to them in three successive crops. From Prince Edward Island to British Columbia, there was a surprising increase in the yield of grain, wrought by that process of systematic selection. The exact amount of increase was computed in percentages. I applied the percentage of increase on those seed-grain plots to the field crops of Canada, and how much more grain do you suppose we would have got from the same area if all the fields had been sown with similarly superior seed, not imported from Kamschatka, but selected from the fields and farms of Canada? How much? Enough grain to fill 1,500 miles of railway cars; enough increase above what we harvested, to fill 1,500 miles of railway cars in one year. Surely that is a confirmation of the statement I made, that, if the methods employed by the best 10 per cent. of the farmers prevailed all over Canada, we would get this doubling of the value of $565,000,000. One might let the grain of those 1,500 miles of railway cars be lost without regret if conditions were created by that sacrifice which caused the farmers themselves to develop increased power of body, mind or spirit. But you see we lost the 1,500 miles of railway cars of grain, or we missed getting the 1,500 miles of cars of grain that we might have had, and we have left in our farming community a continuation of much of the same indifference. The best thing left by the competition of those boys and girls was the ability, the interest, the intelligence, the power, the enlarged life of the boys and girls themselves. That has been finding expression ever since in school gardens, boys' clubs, and the Canadian Seed Growers' Association.

Diseases of Plants

We enquired into the question of the prevalence of plant diseases. That is a whole field in itself. I shall not detain you with more than two very simple illustrations. The Agriculturist of the Commission, Mr. Nunnick, has done remarkably good work for the Commission, for a young man of his brief experience in public affairs. One who has done such good work in such a brief time seems to me to give promise of ever-widening usefulness and service to Canada. Mr. Nunnick visited a farm in the county of Dundas. When he mentioned smut to the farmer, the latter said in effect: "Oh, I do not bother or worry about smut; that does not concern me." Mr. Nunnick steps into his field of oats, and, standing still, gathers forty-three heads of oats

within reach of his arm, each one a head of smut instead of oats. That man was a convert; that was instantaneous conversion. I doubt if any lecturer on agriculture or any writer on agriculture could have converted that man by the use of language, but the revelation of this unknown destroyer by evidence under his nose and eyes converted him at once and he will sow oats hereafter treated to kill the spores of smut. Scores of farmers need that kind of conversion. Taking the farmer's judgment as to the losses, the preventable losses on these 1,212 farms from weeds and insects and plant diseases run to an average of between $75 and $100 per farm. That loss could be prevented by the means which are used by the best 10 per cent. of the farmers.

Prevalence of Weeds

A very little about weeds as such. The report from our collectors is that the Russian sow thistle is a serious and an increasing menace. This weed came into the county of Waterloo in Ontario only six years ago, and those sturdy farmers report that it is getting established in the land. I am not down on some kinds of established institutions but I am down on the establishment of the Russian sow thistle. It came into the county of Lanark a little before that, and this is the report from the farmers themselves: "It is so alarming that we predict that some farms will be abandoned." If a Russian regiment came over here to do us harm what would we say? You remember that little threat of a row when the Russian warships let off a few shots by mistake on those fishing boats of ours. English? No, ours—they belonged to the fellows of our breed and blood—ours. I can remember our teeth tightening. But even that little damage by mistake by Russia made every one of us feel wild—particularly to say things. "What is the British fleet for if not to smash Russian men-of-war that meddle with our ships or our fishermen." They apologized and explained and all the rest, and the thing was hushed up. That is how we felt at the very beginning of an injury from Russia; and the Russian sow thistle comes into Lanark and begins to push our people off the land, and it does not seem to bother us.

In the county of Ontario some farmers are controlling this weed by rotation of crops. There never came an invasion that would not give way to intelligence and ability and energy and good will. This weed is a comparative newcomer, but it is so bad that in Nova Scotia 42 per cent. of the farmers reported it; in Prince Edward Island, 89 per cent.; in New Brunswick, 15 per cent.; in Quebec, 62 per cent.; in Ontario, 56 per cent. and in Manitoba, 30

per cent. In some districts, there are farms now abandoned; the people were pushed off the land by the prevalence of weeds. The weeds came, took possession and held it—and we are a free, liberty-loving, intelligent, and self-governing people.

Then there are wild oats. You know the phrase, "Sowing his wild oats." If a fellow of sixteen had any sort of acquaintance with the real character of wild oats, he would not have any in his seed bin, and, if he had any, he would not sow them. The wild oats got to Manitoba some time ago. That is a new province and yet 94 per cent. of the farmers report them as being there and getting worse. Sixty-three per cent. of the farmers of Saskatchewan report them this year. Only three per cent. of the Albertans reported them last year and this year 31 per cent. reported wild oats on their farms. There is the widening invasion of a menace to the prosperity of our people and the fertility of our farms.

In the Province of Quebec, in the county of Brome, there is becoming established a most persistent weed on pasture fields where cultivation cannot get at it. It is reported on in this way: "The orange hawkweed is threatening to destroy many of the unbroken pasture fields and has reduced their carrying power for feeding stock."

There are others: the ox-eye daisy, the Canada thistle and the couch grass. If we harden our indifference to the invasion of weeds, and neglect a systematic rotation of crops, the plagues of Egypt will not be in it with the experience of Canadian farmers.

After-Harvest Cultivation

In those localities where the system of rotation of crops which is practicable, does not ensure the cleaning of the land from weeds, a system of after-harvest cultivation accomplishes a great deal. Many farmers speak well of the benefits from it in destroying weeds and in preparing the soil for the crop of the following year; and also where rotation of crops is followed, the after-harvest cultivation is most useful.

A special investigation is being conducted in three districts in the Province of Quebec in connection with the growing of alfalfa. The matter was dealt with in full in the report of the Agriculturist.* The prospects are good for the general extension of the growing of alfalfa throughout Ontario, Quebec and the Maritime Provinces. The varieties most likely to be suitable are the variegated form of Ontario, and Grimm's alfalfa as obtained from Minnesota.

*See p. 16 of Third Annual Report.

Sowing of Clover Seed

The practice of sowing clover seed with grain crops is on the increase. The enrichment of the land in nitrogen collected from the air by the clover and the presence of the humus formed from its decaying roots, stems and leaves, are some of the results from sowing clover seed with cereal crops. In the various provinces, on the farms surveyed for the Commission, the percentage of the acreage of grain crops sown with clover are as follows:

Nova Scotia	60 per cent.
Prince Edward Island	57 " "
New Brunswick	50 " "
Quebec	74 " "
Ontario	45 " "
Manitoba	*nil**
Saskatchewan	*nil**
Alberta	*nil*
British Columbia	42 per cent.

Farm Machinery

A good deal of valuable information was obtained on the question of the available supply of farm labour, also on the care, or lack of care, of farm machinery, and of the need of special instruction and illustrations to farmers in the use of gasoline and other engines where power plants are used for field work or in connection with the barns or crops on the farms. Our Committee has no recommendation to offer in regard to these latter matters at present.

I want now to make a few observations on the situation thus revealed. In some respects, we, in Canada, are a self-satisfied people. Other people praise us so much, that, to be agreeable, we join in the chorus and enjoy a reasonable measure of self-laudation. There is quite a different attitude of mind in England and in Germany and in Scotland. I heard people grumble much at the inefficiency of their own institutions in England. They have got the weather habit applied to everything over there; they grumble about the weather and about having a poor system of education, and so on throughout the list. But when you come to examine their schools and their local Government and their roads and their weather, you find they have about the best. It is this discontent—this not ignoble discontent—about what they have that makes them rise up, and stay up, and meet

*Two experimental clover plots of small acreage were found, one in Manitoba and one in Saskatchewan.

the situations. We found some of the best things in educational effort in England and Scotland and Ireland that we found anywhere in our travels. England, Scotland and Ireland have no reason to be ashamed of their leaders in that respect.

To Strengthen Community Interest

The reports from our Survey indicate that a comparatively small number of farms are run under good business management, that is, under good systems of cropping and good methods of cultivation. The farmers say that they have learned much that is helpful from other good farmers in the locality. Our problem is: how can we help that farmer who is doing the best in his locality, to do still better, in order that he and his farm and farming methods may be still more helpful to all the farming of the district where he lives. You cannot get into vital contact with the indifferent farmer in any other way that will be so useful to him, immediately and permanently. As Professor James has said: "The age of talk for the improvement of agriculture has gone by, and the day of demonstration is here." Our immediate duty is to investigate further how that leading successful farmer, that uplifting power in the locality, may have more power and closer contact with his neighbours, than he has had.

There are a good many difficulties, difficulties from the want of knowledge, from the want of incentives to co-operation in the neighbourhood, and particularly from the lack of personal sympathetic contact between the man who needs farming help and the man able to help him. If we are to do anything at all effective in Canada, we will have to bring about these contacts; we will have to get what the Germans have, what the Danes have, what the Irish are now getting—a quickening recognition of community interest that makes every man proud to be one of the helpers, not proud to be an exclusive person or superior person and all that tommy-rot of refined heathens. We want that contact, that intimate contact, between people on a level of common effort that will make the whole community stronger and more prosperous in farming because of what each contributes. If we can discover the best farmers, as we have in many cases, and help them to do still better work for themselves and for the neighbourhood, we will have taken another long step in the right direction. When these most successful farmers recognize that they are helping to advance the agriculture of the locality in a systematic way, they will do more and more in that direction.

We cannot begin with farmers in general on farms in general.

Let us rather concentrate our investigations on a few farms with a purpose quite definite and very evident to the farmers of the locality. The first purpose is to make money from the farms. You may say that this plan is the embodiment of sordidness and my theory of action assumes that the whole object of living is to make money. I do not think that; but I do think that, if a man is not get-at-able on any other side of his nature than on the making of money, I would get at him there, in the hope that the other sides of his nature would by-and-by be awakened. If you want the people to adopt better methods, that is the first way to reach them. This is not primarily a system of morality or ethics, but a system of farming for profits. The first object is an increase of profit to the farmers from the crops. That must be definite, evident and successfully realized. Afterwards will come the wider values and benefits from these illustration farms.

Co-operation in Denmark

May I detain you by a few remarks on what I have observed elsewhere in this connection. I was in Denmark about twenty-six years ago, and I learned then that the Danes had picked out the best farms all over the kingdom and, during many years, had given grants to hundreds of young farmers to go and live and work and learn on these farms. The young farmers brought back to their own localities not simply a knowledge of principles on which they could pass an examination, but a working knowledge of the systems, practices and methods. All Denmark was seeded down to the practice of the best farms. That was worth while. No farmer to-day in Denmark feels he has done his duty, if he has discovered a better method of raising a crop or feeding a cow, until he gets all the others to adopt the same method. That is real co-operation—everyone chipping into the common basket whatever he has gained of knowledge or ability that may serve the locality. That basket is always full, and every man who takes out makes the basket richer. What are some of the results in Denmark? From being about the poorest nation in Europe, Denmark is now the most prosperous in the world of those whose main industry is farming. It has become so in less than my lifetime by these methods I am indicating. What can we not accomplish if we follow similar methods? We have a better chance on this great continent by reason of our resources and our population and our opportunities.

The Danes take from England enough *more* money than any other nation obtains for an equal quantity of butter, bacon and eggs because of their superior qualities, to pay for their whole educational work and to have a balance over. For the superiority of their but-

ter, bacon and eggs, they get, as a premium, more than we spend on our rural schools from the Atlantic to the Pacific. That is a fine tribute collected by the ability of these people. My visit to Denmark last year gave me the impression that they are using it for further training and further enlightenment and further development.

Few Weeds in Britain

I do not want to say anything disparaging about Canada; I have spent most of my life here, but I have to go to Scotland once in a while to get the delight, the refreshing delight to one's eyes, of seeing farming land that is clean, and beautiful through its cleanness. You know that in riding on the railway from here to Montreal and from Montreal either east or west; from here to Toronto and from Toronto east, north or west; from here to Winnipeg and from Winnipeg in any direction, you see weeds and weeds and weeds and weeds and weeds, and then more weeds, and then, on top of that, another lot of weeds. The Scotch farm is clean because on it are employed the methods I am indicating—the systematic rotation of crops, the selection of seeds, the seeding to clover and the spreading of the labour over the whole year.

Farming in Ireland

Then, in little distressful Ireland,—that lovable island which loves its miseries and talks about them so much that that is where they have their embodiment—there has grown up a new Ireland within the last ten or twelve years by means of progress in agriculture and technical education. I went to see a group of "colonists" in the west of Ireland. Here was a big pasture estate turned into farms of 25 to 30 acres. I found a resident farming instructor with these two hundred and fifty "colonists." They had been on these farms less than three years; and a resident farming instructor was living on the spot and visiting them from day to day. That was his job. He was a young farmer himself, who had attended short courses provided by the Department of Agriculture. He was not allowed to make speeches. I thought that was capital. That was the one inhibition and he enjoyed it. The authorities did not want the instructor to make speeches. His duty was to counsel the individual and show him the best systems and methods of work. It cost some £150 sterling for this instructor's salary and expenses. He had an illustration field on one of these farms. On that illustration farm, crops were grown in some of the best ways, and demonstrations were given of crops and methods new to the locality. I estimated that the crops on these 250 farms in 1911 were worth at least $15,000 more than if

the instructor had not been there. He made the contact not only between the Department of Agriculture and the farmers, but between the farmers and the illustration fields, and between the farmers themselves. One hundred and fifty pounds of Government money spent and £3,000 of increased value in crops plus the residuum in the increased abilities, goodwills and co-operations of all the farmers in the "colony." We could have a system such as that over Canada. That is co-operation between the central authority, doing a definite thing close by the people, and the people themselves who benefit by it, in the enrichment of life as well as in the gathering of larger profits.

Ontario is doing much, very much of that sort of thing. It has an Experimental Union that touches five thousand farmers. In fifteen counties the farmers are brought into contact with the Agricultural College and the Department of Agriculture by District Representatives, who work with the farmers, like this Irish resident instructor. They have made great progress. The idea of our civilization is that of associated effort of the people by the people, for the people—associated effort on the spot for the common good.

This year, the Committee on Lands will enlarge its work of investigation. Probably 50 farms, the best 50 out of the 1,212 surveyed in 1911, will be selected as illustration farms. It expects to have a few experienced and competent farmers visit and counsel with these farmers for further progress. The other farmers whose farms are being surveyed by our collectors of information, will be invited to meet on these farms two or three times a year to discuss the farming of that locality for themselves with these talented, experienced visiting farmers who come to investigate and help them. So may we realize Sir Horace Plunkett's goal of "better farming, better business and better living."

What will this mean also to the people who are not farmers, to the merchants and the manufacturers and the transportation people and the professional people, to the whole people? What will it mean to education? It will help us not merely to pass on this heritage of ours unimpaired and undiminished, but to leave it enriched and improved by intelligent labour and co-operative good will. Our Committee on Lands is working towards that end and I think success will attend our efforts.

Agricultural Survey, 1911

By

F. C. Nunnick, B.S.A.

Agriculturist of the Commission of Conservation

THE following is a very brief summary of the agricultural conditions found by the Commission of Conservation in the localities where the Agricultural Survey was conducted in 1911.

NOVA SCOTIA

Pictou and Antigonish

Most of the farmers in these counties grow a small amount of grain and a large amount of hay and pasture. Very few follow a systematic rotation of crops. Nothing is done in the way of seed selection more than to grade the grain through a fanning mill. The amount of clover seeded each year is small and the number of pounds to the acre is insufficient to secure a good stand. Windmills and gasoline engines are not to be found on many of the farms. The water supply is reported as bad in many cases. Very few have modern conveniences in their houses. Lack of help and weeds (especially ragwort) are the principal drawbacks. Mixed farming and hay growing are practised. Where orchards have been sprayed there is a marked improvement in the quality of the fruit. Many farmers admit that they should adopt shorter rotations. One man at River John was very enthusiastic over the effects of a short rotation on the bindweed on his farm, stating that he had almost exterminated the weed by this means.

Colchester County

Very few farmers grow a large amount of grain and the acreage in hoe crop is usually small. Many of the rotations have two years of hoe crop followed by grain and hay. Very little in the way of seed selection is practised, most of the farmers using the ordinary fanning mill. The amount of clover sown to the acre is small. Many use artificial fertilizer on roots and grain crops. Very little grain is treated for smut. The wood supply in most cases is good. Practically no forest tree planting has been done. There are very few windmills or gaso-

Commission of Conservation

AGRICULTURAL SURVEY, 1911

IX. WEEDS

(Figures given as percentages.)

	NOVA SCOTIA							PRINCE EDWARD ISLAND							NEW BRUNSWICK							QUEBEC						
	1	*a*	*b*	*c*	*n*	*i*	*d*	1	*a*	*b*	*c*	*n*	*i*	*d*	1	*a*	*b*	*c*	*n*	*i*	*d*	1	*a*	*b*	*c*	*n*	*i*	*d*
Barnyard Grass	84	44	40	—	—	7	14	R	—	—	—	—	—	—	41	—	—	—	—	—	—	16	—	—	—	—	—	—
Bindweed	17	10	7	—	—	7	—	R	—	—	—	—	—	—	14	—	—	—	—	—	—	R	—	—	—	—	—	—
Bladder Campion	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	13	—	—	—	—	—	—
Blue Burr	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—
Blueweed	—	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—	12	—	—	—	—	—	—
Canada Thistle	77	25	49	—	—	11	12	81	69	15	—	—	11	8	51	36	15	—	—	18	23	79	42	37	—	—	9	—
Chickweed	19	—	—	—	—	—	—	12	—	—	—	—	—	—	20	—	—	—	—	—	—	R	—	—	—	—	—	—
Chicory	R	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—	28	14	6	2	—	—	—
Couch Grass	92	32	53	7	—	24	31	86	76	10	—	—	7	10	81	14	51	16	—	46	31	73	31	32	10	—	20	8
Darnel	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—
Golden Rod	34	10	24	—	—	—	—	52	40	12	—	—	11	—	46	—	—	—	—	—	—	30	—	—	—	—	—	—
Green Foxtail	20	—	—	—	—	—	—	57	50	7	—	34	9	—	20	—	—	—	—	—	—	53	15	15	—	—	3	—
King Devil	R	—	—	—	—	—	—	R	—	—	—	—	—	—	49	20	7	22	42	37	—	R	—	—	—	—	—	—
Lady's Thumb	48	16	27	5	—	17	—	34	—	—	—	—	—	—	11	—	—	—	—	—	—	24	—	—	—	—	—	—
Lamb's Quarters	57	21	27	5	—	17	—	—	—	—	—	—	—	—	47	31	16	—	—	10	31	65	16	20	—	—	5	5
Mayweed	7	—	—	—	—	—	—	39	—	—	—	—	—	—	13	—	—	—	—	—	—	R	—	—	—	—	—	—
Milkweed	14	—	—	—	—	—	—	27	—	—	—	—	—	—	11	—	—	—	—	—	—	21	—	—	—	—	—	—
Mustard	20	11	7	2	4	3	8	28	—	—	—	—	8	—	24	11	5	8	3	20	—	58	34	24	1	—	4	—
Night Fl. Catchfly	R	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Orange Hawkweed	5	—	—	—	—	—	—	10	—	—	—	—	—	—	R	—	—	—	—	—	—	19	6	—	13	—	14	—
Ox-eye Daisy	89	12	46	31	—	12	19	63	53	10	—	9	28	—	82	23	57	2	—	52	22	84	30	41	12	—	22	5
Pigweed	21	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	57	20	14	—	—	—	—
Ragweed	24	3	18	3	—	3	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	12	—	—	—	—	—	—
Rib Grass	21	16	5	—	17	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—
Shepherd's Purse	23	18	5	—	—	—	—	35	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	5	2
Sow Thistle	42	33	9	—	—	14	4	89	53	36	—	—	20	33	15	—	—	—	—	8	—	62	44	14	5	—	13	—
Stinkweed	—	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—	5	—	—	—	—	—	—
Tumbling Mustard	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	14	—	—	—	—	—	—
Wild Buckwheat	30	27	3	—	—	—	—	50	—	—	—	—	13	—	11	—	—	—	—	—	—	R	—	—	—	—	—	—
Wild Carrot	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—
Wild Flax	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	1	R	—	—	—	—	—	—
Wild Oats	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	6	—	—	—	—	—	—
Yarrow	—	—	—	—	—	—	—	—	—	—	—	—	—	—	54	31	33	—	—	—	—	28	—	—	—	—	—	—

	MANITOBA*							SASKATCHEWAN							ALBERTA †							BRITISH COLUMBIA						
	1	*a*	*b*	*c*	*n*	*i*	*d*	1	*a*	*b*	*c*	*n*	*i*	*d*	1	*a*	*b*	*c*	*n*	*i*	*d*	1	*a*	*b*	*c*	*n*	*i*	*d*
Barnyard Grass	50	30	20	—	1	—	1	R	—	—	—	—	—	—	8	7	1	—	—	—	—	—	—	—	—	—	—	—
Bindweed	15	13	1	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bladder Campion	12	12	—	—	9	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Blue Burr	27	25	1	1	—	1	—	12	—	—	—	—	—	—	36	26	10	—	—	4	—	R	—	—	—	—	—	—
Blueweed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—
Canada Thistle	86	22	48	16	—	24	25	97	61	15	21	15	46	22	33	31	2	—	9	19	2	R	—	—	—	—	—	—
Chickweed	9	9	—	—	—	—	1	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chicory	8	7	1	—	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Couch Grass	73	34	31	8	2	4	36	32	—	—	—	6	14	—	8	7	—	1	—	2	6	R	—	—	—	—	—	—
Darnel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Golden Rod	33	21	10	2	—	5	4	10	—	—	—	—	—	—	40	24	14	—	—	2	—	R	—	—	—	—	—	—
Green Foxtail	57	25	30	1	—	2	9	18	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—
King Devil	R	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—
Lady's Thumb	10	7	3	—	—	1	1	R	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—
Lamb's Quarters	53	21	30	1	—	5	6	70	23	47	—	—	17	49	71	20	40	8	—	13	38	50	42	8	—	—	—	—
Mayweed	15	13	2	—	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Milkweed	41	27	12	2	—	10	6	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mustard	34	13	8	13	1	9	11	18	—	—	—	—	7	—	36	34	1	—	—	6	12	R	—	—	—	—	—	—
Night Fl. Catchfly	31	30	1	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Orange Hawkweed	R	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—
Ox-eye Daisy	22	16	4	2	—	7	2	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pigweed	62	34	26	2	—	5	5	38	6	32	—	—	—	—	22	—	1	—	—	—	6	R	—	—	—	—	—	—
Ragweed	51	18	23	10	3	10	4	R	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—
Rib Grass	35	18	15	2	5	7	2	—	—	—	—	—	—	—	R	—	—	—	—	—	—	R	—	—	—	—	—	—
Shepherd's Purse	39	31	8	—	—	5	2	20	—	—	—	—	11	—	47	40	4	2	—	3	13	22	—	—	—	—	—	—
Sow Thistle	56	38	14	4	28	19	5	30	11	6	13	—	24	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—
Stinkweed	R	—	—	—	—	—	—	55	27	28	—	—	37	—	40	9	14	18	—	6	31	R	—	—	—	—	—	—
Tumbling Mustard	R	—	—	—	—	—	—	R	—	—	—	—	—	—	18	17	1	—	—	4	13	15	—	—	—	—	—	—
Wild Buckwheat	43	26	15	1	1	3	4	12	—	—	—	—	—	—	64	32	32	—	—	6	32	7	—	—	—	—	—	—
Wild Carrot	R	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Wild Flax	11	10	—	—	1	—	3	R	—	—	—	—	—	—	6	4	1	—	1	—	—	R	—	—	—	—	—	—
Wild Oats	24	13	8	3	—	2	10	91	31	34	29	—	69	22	63	37	21	6	—	30	11	31	26	5	—	—	—	—
Yarrow	19	16	3	—	—	1	1	—	—	—	—	—	—	—	26	—	—	—	—	—	—	—	—	—	—	—	—	—

KEY TO LETTERS

Column (1) gives total percentage of farmers reporting the weed.
Column (*a*) gives percentage reporting it as scarce on farm.
Column (*b*) gives percentage reporting it as numerous on farm.
Column (*c*) gives percentage reporting it as very bad on farm.
Column (*n*) gives percentage reporting it as new to farm in last five years.
Column (*i*) gives percentage reporting it as increasing.
Column (*d*) gives percentage reporting it as decreasing.

Key to colours in column (1)

Red, 75 per cent. and over.
Blue, 50 to 74 per cent.
Green, 30 to 49 per cent.
Black, less than 30 per cent.

*Wild Barley, 37.
Pepper Grass, 37.
Ball Mustard, 20.

†Ball Mustard, 40.

line engines to be found. Dairying, mixed farming and beef-raising are the principal branches of farming specialized in.

Annapolis County

The farmers here pay more attention to the orchard than to any other part of the farm. Such a small amount of grain is sown that the rotation, even if it is good, is not so important as in districts where more grain is grown. The fanning mill is used in almost all cases for cleaning seed. Not enough red clover is sown. Manure is used on grain crops and orchards. Many of the farmers use artificial fertilizer. On the whole, the care of the manure is fairly good. Orchard pests are prevalent. Wood is abundant in most cases. Windmills and gasoline engines are not to be found on many farms. The water supply in many cases comes from the mountains and is good. Orcharding is the chief industry. Indeed, farmers pay so much attention to this industry that they neglect their other crops. If the apple crop is a failure, they have very little to rely upon in the way of grain crops and stock. Many farmers admit having purchased grass seed and seed grain which contained new and noxious weeds. If farmers would buy nothing but the best inspected seed, many of the bad weeds could be kept under control.

PRINCE EDWARD ISLAND

A large portion of the land is in hay and pasture. The rotation, if such it can be called, is long with not enough hoe crop entering into the system. The land is sown to grain, seeded down and left in hay and pasture for from four to six years. Very little systematic seed selecting is done, the common practice being to put the grain once or twice through the fanning mill. The amount of clover seed sown to the acre is too small. The manure is, in the majority of cases, piled in the open yard and drawn to the root and hoe crop fields in spring. A little top dressing is done. Weeds are very bad in many places and some of the worst weeds are the most prevalent. Insect pests and plant diseases are quite prevalent. Codling moth and potato beetle are perhaps the worst. The fuel, in the majority of cases, is good. The water supply is polluted and, in very many cases, inconvenient. Very few windmills or gasoline engines are to be found. Some farmers complain of the boys leaving the farm, making it hard to keep up the work and control the weeds. In some places, the machinery used for spring seeding is still standing in the fields. Carelessness is all too evident.

NEW BRUNSWICK

Carleton County

Most of the farmers grow a large amount of hay. The rotation is long on most farms. The majority of the farmers grade the seed grain through the fanning mill. In most cases, a small amount of clover seed is sown and a large amount of timothy. The manure is applied to grain and root crops and top dressing of meadows is practised to some extent. In some instances, the fine well-rotted manure is harrowed into the soil before the grain is sown, but, with the root crops, it is ploughed under. Some of the worst weeds are prevalent on most of the farms. There is much neglect and carelessness evident in allowing weeds to go to seed. Seed grain is very seldom, if ever, treated for smut. The wood supply is good in most cases. No windmills and only two or three gasoline engines were found in this district. The water supply on some farms is very poor. Conveniences around the house and barn are not often found.

Kings County

Grain, hay and pasture are the principal crops in this county. Very few roots are grown. The rotation on most farms is too long. Very little is done in the way of seed selection, the most common practice being the grading of the ordinary seed with the fanning mill. Not enough clover is seeded down and the amount sown to the acre is too small. Manure is used on roots and grain. A large number of the farmers use artificial fertilizer on roots. Very little attention is paid to prevent waste of manure. Impure grass seed is given as the cause for the introduction of some of the worst weeds. The codling moth has done much damage in some districts. Windmills and gasoline engines are almost unheard of. There are very few conveniences in the houses. Lack of help and weed pests are the principal drawbacks mentioned.

On many farms the animals show the effects of selling the best hay and grain and keeping the poorest for home use. Many were surprised when told that they could increase their yields by careful seed selection. The reason given by a considerable number for not selecting seed is lack of time, but, judging from the carelessness which is in evidence almost everywhere, very little time is given to improvements of any kind.

Kent County

The conditions in this county were found to be very similar to those in Kings and Carleton counties.

QUEBEC

L'Assomption County

Most of the farmers specialize in hay with some live stock and tobacco, but very little of any other hoe crop is grown. Systematic rotation of crops is almost unknown. Seed from the best field is usually kept and put through the fanning mill, but not often cleaned more than once. Very little is known regarding the names of varieties of grain grown, there being but few who knew anything about it. The yield is not, in any case, what it should be. Sufficient clover is not sown and the amount sown per acre is too small to secure a good stand. Manure is used principally on hoe crops, with small amounts sometimes used for top dressing. A few use artificial fertilizer on tobacco. Manure spreaders are almost unknown. Very little care is taken to prevent waste: the manure pile is usually in an open yard and unprotected. There are many bad weeds to be found in the meadows and as hay is sold and shipped to other districts, this is a very serious matter. Many pests are prevalent which could be controlled if properly looked after at the right season. The wood supply is plentiful. Gasoline engines and windmills on the farms are few in most cases, the water supply is not the best, many using water from a nearby stream or river. In some cases, the supply comes from springs in the hills and is good.

Pontiac County

Very few practise systematic rotations. Most of the farmers grow grain for a year or two, followed by hay for several years. Very little hoe crop is grown. In the majority of cases, grain from the best field is chosen and screened with the fanning mill. In nearly every case, timothy is grown with the clover for the hay and pasture mixtures. Much of the manure is used as top dressing for meadows. Very little care is taken to prevent waste of manure. Many of the farmers blame the impure grass seed for the introduction of some of the worst weeds. Fire blight on the apple trees seems to be doing much damage in this locality. Very few windmills or gasoline engines are used. Few farm conveniences are found in the buildings. The labour problem is a serious one here. A large number of the farmers do not believe that a change from the present system of farming would be profitable. Many of the farms are in a worn-out condition and illustrations of up-to-date methods are needed.

Bellechasse and Charlevoix

Grain does not form a large part of the cultivated crops in these counties. Very little hoe crop is grown, the chief crop being hay. There is practically no rotation of crops. A little field selection of seed is done and most

of the farmers run the grain through the fanning mill. The amount of clover sown to the acre is small. No very marked increases are recorded. A small amount of manure is produced on each farm on account of the stock being small and, in most cases, poorly cared for. Very little attention is paid to the protection of the manure. The losses reported from insect pests and plant diseases are small, although if the actual loss were known it would, in all probability, be greater than that reported. The wood supply is good, there being enough to last a great many years. Very few windmills are found on the farms in these counties. Gasoline engines are almost unknown. A large number of farmers obtain water from springs and streams, many of which are poorly situated, thus endangering the purity of the supply. In nearly every case where water is taken from a stream the stream is lower than the house and barns. Very little in the way of modern conveniences is to be found. Drainage is badly needed in both counties. Several of the farmers had received seed grain from the Central Experimental Farm and complained of it not being free from other grains. There is too much land occupied by unprofitable growth such as shrubs and weeds.

Brome County

The main crops are hay and pasture. Systematic rotation is almost unknown. The general practice is grain seeded down and left for eight or ten years. Dairying is the principal industry. Very little grain is grown and the seed is usually purchased. Not enough clover is sown. A large number of the farmers use chemical fertilizer on hoe crops and some use it on the grain crops. Weeds are very bad, the orange hawkweed threatening to destroy many unbroken pasture fields. There is practically no treating of seed grain for smut. The wood supply, in most instances, will last a long time. Very little in the way of windmills or gasoline power is to be found on the farms. The labour problem is acute.

Huntingdon County

A large portion of the cultivated land is in hay and pasture. The most common rotation—if it can be called a rotation—is grain followed by hay and pasture for from four to eight years. But little hoe crop is grown on any of the farms. Very little is done in regard to selection of seed, the fanning mill being used on most farms. Some farmers, when approached concerning selection of seed, either by hand or in the field, confessed that they had never thought of it. In most cases, not enough clover seed is sown to the acre. Many put manure on hay

or pasture land which they intend ploughing for either hoe crop or grain. Very little care is taken to prevent waste. Weeds are bad on most of the farms. Wood is used as fuel in almost all cases. Windmills and gasoline engines are few. Water supply, in many instances, is bad. The drawbacks mentioned are lack of help, weeds and pests. The crops on many of the farms are thin and short and would be much improved if a systematic rotation and the growing of clover were introduced.

ONTARIO

Essex County

A number of the farms in this county are small, especially in the Leamington district. Tobacco growing, fruit growing and the raising of early vegetables are the principal lines of agriculture followed. A number of the rotations have two or three hoe crops, such as tobacco, corn, clover and vegetables. Clover crops are used to a large extent in supplying fertility to the soil. The land is well cultivated and the manure, in most instances, well looked after. On these small farms, there is very little grain grown other than corn, the seed of which is carefully selected. In seeding down to clover, the farmers sow from ten to fifteen pounds of clover seed to the acre, which insures a good stand. In comparing the crops of to-day with those of ten and twenty years ago, the farmers say that since they have adopted the new system of more intensive farming, it is hard to make the correct estimate of increase or decrease, but nearly all state that the returns are much larger than formerly. The manure is used on the early vegetables and some chemical fertilizers are used to supplement the supply of barnyard manure, which is very carefully looked after by most of the farmers on the small places. While on most of the farms a large number of weeds are reported, a great many of the farmers say that they are not a cause for anxiety, as vegetable growing and plenty of clover keep them down. Many pests are reported, most of which may be kept under control by careful spraying. Many of the farmers have windmills for pumping water and doing part of the barn work. The majority of the wells are in good condition. Many in this district have the water piped to the house and on tap and have a bath-room and a water closet in the house. The majority of the farmers are prosperous, as is evinced by the conveniences around the buildings and on the farms. This may be attributed to keeping plenty of stock, careful use of manure and good cultivation.

Norfolk County

Some splendid fruit land is to be found in the county of Norfolk. A number of the farmers are going into small fruits and orcharding. The rotations are fairly good, but very little is being done in systematic seed selection. Several stated as their reason for not taking up this work that they had never thought of it. A large percentage of the grain acreage is seeded to clover each year. A number of the farms visited had changed hands within the last few years, hence a comparison of crops on these farms with ten and twenty years ago could not be obtained. A great many weeds were found. The Hessian fly seems to have been particularly bad in this district of late. The loss from other causes is hard to estimate.

Lanark County

Dairying is one of the principal industries in this county. A great many of the farmers have a large percentage of their land in hay and pasture. Many follow a rotation such as hoe crop, grain and then hay and pasture for several years, prolonging the course to six or seven years. Very little wheat is grown in this county, the majority of the farmers growing large quantities of oats. A very few practise seed selection, the general practice being the use of the fanning mill. Most of the farmers sow a small quantity of clover in their seeding-down mixture, while a number sow more timothy than clover. A large number of the farmers haul the manure to the field in winter as made. The perennial sow thistle is a new weed in Lanark county and is increasing rapidly. Potato blight seems to be on the increase. The loss reported from oat smut and rust, is small and, in all probability, underestimated. There is a considerable amount of wood yet in the county. There is a lamentable lack of farm conveniences in both the houses and barns. The labour problem is a serious one.

Dundas County

A large percentage of the area under field crops is in hay and pasture. The majority of the farmers follow a very good rotation of crops. A number follow field selection with regard to seed grain, but none were reported as doing any hand selection. Most of them cleaned their seed with the fanning mill. Most of the farmers visited haul the manure out in the winter time. A large number complain of impure seed being the cause of the introduction of some of the worst weeds. Very few treat the seed grain for smut, the result being that there is much loss from this disease. The estimated losses from many of the pests reported are small, but, in all probability, if the exact losses were known, they would be considerably higher than reported. Many

of the farmers in this district have gasoline engines for barn work. The water supply on the majority of the farms visited is reported as good. Dairying and hog-raising are followed on a large number of farms.

Ontario County

The rotation followed by the majority of farmers is very irregular and, in most cases, too long. This allows weeds to become prevalent in the hay and pasture land. A large number of the farmers buy their seed grain and clean it carefully with the fanning mill. The majority sow some alsike with their clover. Some of the farmers visited have been on the farms but a short time and, hence, cannot give much information regarding yields ten and twenty years ago. Most of the manure is used on the hoe crops, but some is used on wheat and summer fallow. A large number of weeds are reported and pests are said to be very prevalent. The losses estimated in dollars and cents, if totalled, would amount to a large sum. Very few have water piped to the house or water on tap, or bath and water closet. One man suggested sending practical agriculturists to Europe to choose suitable labourers for Canadian farms.

Waterloo County

Most of the rotations are long and irregular, although many of the farmers vary the system to suit conditions and do not adhere strictly to any systematic arrangement. Not enough clover is sown. Manure is used chiefly on the hoe crop and the odds and ends are used on wheat land and summer fallow. Where any top dressing is done, the application is lighter than on the hoe crop. A number of the farms are reported as needing more humus. Where the weeds are decreasing it is due chiefly to clean cultivation, pulling, cutting and preventing them going to seed. Many report annual weeds which do not give much trouble in the cultivated crops, but are troublesome in pasture or meadow lands that are left uncut or unploughed for a long time. Losses from pests are given in dollars and cents and aggregate a heavy loss. The controllable pests cause average losses of from $75 to $100 per farm which, on 100 farms means a heavy total loss. A number of reports were received on naked smut of barley, barley leaf stripe, oat blade blight, Hessian fly and fire blight.

MANITOBA

Carberry District

Grain growing is "King." No systematic rotation of crops is followed. On the 25 farms visited in the Carberry district there was no clover being grown. The common practice is to sow wheat, oats or barley for from three

to five years, with one year of fallow. A few of the farmers are growing some corn for fodder. The majority of the farmers are fairly careful to clean their seed grain with the fanning mill. Many admit smaller yields now than ten and twenty years ago. The amount of manure produced is small and is used on the potatoes and garden crops, and grain close to buildings. Much carelessness is evident regarding the care of manure. Nearly all of the farmers are troubled with wild oats. Very little loss is reported from pests or plant diseases. All of the farmers treat seed grain for smut with good results. A little tree planting around the buildings has been done. The source of water supply is often from a well under the house, and, for stock, from a well in the barn. Many of the farmers realize that they must change their system from all grain to one having a greater share of forage and clover crops, as the land in many places is becoming loose, and is blowing.

The following is a summary of the remarks made by the collector on one farm and which is applicable to many. "Mr. .... does not seem to be one of the progressive farmers but seems to be content to travel in the same old rut and consequently does not get on well. After thirty-one years in a district like this, one would expect to see a man with a well-improved farm, but here we see one where no trees have been planted and a very old and small house is still used. Machinery is not cared for and things in general are not fixed up around the place, yet it is not because of financial difficulty, it seems rather to be lack of attention."

The following is what is said by the collector of a man who is careful in looking after his farm and interests. "Mr. .....'s farm is one of the cleanest I have met with. He undoubtedly has some of the bad weeds, but they are few in number. His crops look especially well and, in talking to his neighbours, I find that they consider him one of their best farmers. One man told me that he always had clean crops and always had three or four bushels more to the acre than any of his neighbours. He uses a lot of manure and works his land well." More men of this kind are needed in Manitoba.

Wherever the farms were rented they were dirtier and poorly looked after. The principal causes given for the spread of noxious weeds are, moving waggons and machines from place to place at threshing time, stock threshing, insufficient cultivation, too much grain growing with not enough hoe crops, grass and clover; and weeds on roadsides, in ditches, on headlands and in waste places being allowed to go to seed.

Morden District

Conditions here are very similar to those in the Carberry district. One man near Morden has a first-class orchard and is paying considerable attention to the growing of apples. His farm is pretty well adapted to this, as it is situated in a very sheltered spot. Weeds are allowed to go to seed in waste places and the weed inspector is not strict enough. This points out very clearly the necessity of having weed inspectors who are not local men. Local men are likely to be afraid of offending their neighbours, hence they neglect their duty. Several men who are raising some stock complain of poor marketing facilities for it. Nearly all the farmers in this district need more hoe crop and stock to clean and strengthen the land. Where any care is taken of the manure, it is in hauling it out to the land direct from the stable as made. No manure sheds are used.

Hamiota District

This is a first-class farming district. While very little hoe crop is grown and a very small amount of stock is kept on each farm, the crops were good and most farms were very clean. The system generally followed is wheat, wheat, oats or barley and summer fallow. The majority of the farmers are very careful about cleaning their seed grain. No clover is grown. A number of the farmers burn their straw. Very little attention is paid to the production and care of manures. No pests were reported. On a number of farms without wood lots the supply is reported as indefinite. This will be understood when it is remembered that on these same farms there are some bluffs which will supply a small amount of summer wood where coal is used in the winter. The water supply, in some cases, is very poor. A specialty is made of grain growing on most farms. There are some excellent farms in this district. The following remarks by the collector show what can be done if care is taken when the farm is first occupied: "The most home-like farmstead in the township. Berry bushes, strawberry vines, shrubs, hedges, tennis lawns and flower beds in profusion (not confusion), for all is carefully laid out and kept clean. The farm crop is also clean and well tilled. A real home-like home, a nice place to live." There are, of course, some dirty farms in the district, especially where the farms are rented.

SASKATCHEWAN

Of the districts surveyed in Saskatchewan, ninety-eight per cent. of the field crop area is in grain; it is plainly seen that wheat is "King." Less than one-half of one per cent. of the field crop

area is in hoe crop, so that it would take more than two hundred years, at this rate, for the hoe crop to cover the field crop area if it were grown each year on soil that had never before had hoe crop on it.

Smithville District

The most common practice with regard to the rotation of crops is three years of grain crop and one year of fallow. So far, there seems to have been no need felt for the husbanding of soil fertility. The importance of good seed has been very strongly impressed on the average farmer, and while very few do anything in the way of field selection, the fanning mill is used to good advantage on almost every farm. The growing of red clover has not yet been attempted in the localities of the Survey. Alfalfa is being gradually introduced. The majority reporting upon the present yield as compared with that of ten and twenty years ago, say that their crops are about the same. About 75 per cent. of the farmers make use of the manure produced, while about 25 per cent. burn the manure. The weed problem is becoming more and more serious each year. The agencies which are at work in the distribution of weed seeds are numerous, and suppression is a matter needing prompt attention and drastic treatment. The solution of the problem is, to a large extent, in the hands of the farmers. Insect pests have done and are doing very little damage as yet. The use of formalin and blue-stone has reduced the loss from smut to a minimum. The wood supply on the average farm is so small that it is hardly worth mention. Some little attention has been paid to the planting of trees around a few of the houses. The farmers, are, however, coming to realize that they must adopt a system of rotation which will include clover crops or grasses. On some of the light soils, the root fibre has become so depleted that the soil is beginning to blow. This, however, can be remedied by the production of crops which will leave a root matter in the soil.

Indian Head District

The majority of the farmers grow wheat and oats and, on a number of the farms, there is to be found some permanent and unbroken pasture. Very little hoe crop is grown and very little cultivated hay. A number of the farmers report enough wood to last indefinitely. The farmers reporting wood enough to last for some time do not take into consideration the wood to be found on the unbroken pasture. Thus the supply is good for some time, even where no wood lot is reported.

The most general rotation is wheat, grain and fallow. All who were visited in this district use cleaned seed. In most instances, the seed grain is treated for smut. Many of the farmers burn the manure. A large number of the worst weeds prevail in this district. Where the weeds are few and decreasing, the reasons given are summer fallow, good tillage and careful seed selection. Very few pests are reported. Some tree planting has been done around a number of the houses as shelter belts. A few use gasoline engines or steam engines for field work, but horses are used on the majority of farms. Many of the houses have nothing in the way of a convenient water supply or bath room and water closet. A number of the farmers report frost and hail as drawbacks and are beginning to realize that they must keep more stock for the sake of certainty of income. Wheat is "King" in this district.

ALBERTA

Edmonton District

There is probably more mixed farming followed in this district than in many others. It is well adapted for the raising of stock, as there are numerous bluffs for shelter and considerable pasture land. Oats and barley are grown to some extent. About one-third of the farmers make no attempt to follow any systematic rotation of crops. The rotations are grain and fallow systems with no clovers. The majority of the farmers seem to realize the importance of cleaning the seed grain but very few think it worth while to hand or specially field select. Many of the worst weeds grow in rank profusion in this district, including wild oats, Canada thistle and wild mustard. Insect pests are very few and have done but little damage. The fuel supply is unlimited, as coal is to be found underlying nearly all the farms in the district. The water supply is poor on many farms. The buildings are very poor, the barns, in many instances, being but low and poorly constructed shacks. Very little care is given to the implements. Some of the manure produced is used, but a number of the farmers make no use of it whatsoever. Careless and wasteful methods are all too common.

Stavely District

This district is devoted almost entirely to grain growing. Grain is grown from three to four years followed by summer fallow. The majority of the farmers are careful to grade their seed grain through the fanning mill. No clover is grown. This district has not been settled for

more than about eight years, hence no record as to increase or decrease of crops in the last ten and twenty years is to be had. Very little attention is paid to the manure. There are very few weeds in the district as yet. Practically no pests were reported. Most of the farmers treat their seed grain for smut. Coal is used for fuel. Very little tree planting has been done. Horses are used as motive power on the farms, with an occasional steam engine for ploughing. There is a great similarity of conditions in this district. Some farms where grain growing has been continually practised since the land was broken, are already beginning to show the effects in lighter yields and the prevalency of weeds.

BRITISH COLUMBIA

Thompson Valley, Okanagan, Kootenay and Arrow Lakes Districts

So far as agricultural operations are concerned it may be said that they are very irregular, that is, some of the farmers grow a considerable amount of grain, some specialize in one or other of the vegetable crops, some specialize in hay and stock, while a large number grow vegetables and small fruits between the trees in their newly set orchards, with the expectation of specializing in fruit in the very near future. Some of the ranches are large, sometimes consisting of thousands of acres with only a very small portion broken, while others again are but a few acres in extent. So far as rotation is concerned, it can scarcely be said to exist. Where a small amount of grain is grown, it is alternated with hoe crop, and where a large amount of grain is grown, it is grain crop after grain crop for several years. A majority of the farmers visited buy their seed grain and many complain that they are unable to obtain it free from noxious weeds. Many of the farmers visited have been occupying the land for less than ten years, hence comparison with ten years ago could not be made. Manure is used in most cases on the orchards and vegetable crops. Artificial fertilizers are used on the garden crops by many of the farmers. Very little care is taken of the stable manure to prevent waste. Many bad weeds are found in almost all the localities visited, and the farmers were complaining of the weeds imported in seed grain and grass seed, and the carelessness of the railroads and construction gangs in bringing in and distributing weeds from baled hay and feed grain; and also of the lack of proper weed inspection and enforcement of the laws where such exist. A number of pests were reported from almost all the districts visited, but the loss on the whole was not heavy. Cut-worms and other garden pests have

caused a loss to the green stuff in the gardens, which, of course, is serious where the farmers are specializing along this line. The wood supply on the large ranches is good for a long time, but, on the smaller holdings, the wood is being cleared off rapidly so that the land can be used for fruit and vegetable growing. There is an occasional gasoline engine to be found. The water supply is taken largely from streams and, in many instances, is excellent. Some cases, however, were reported where the sanitary conditions were very bad. Conveniences such as water on tap in the house, bath rooms and water closets are not as much in evidence as they should be, considering the ease with which such appliances could be installed.

Drawbacks.—A great many of the farmers in all the above districts complained bitterly of the lack of proper control of the water supply for irrigation when needed during the dry season. The following quotations from the reports sent in speak for themselves: From the South Thompson valley, the following,—"One drawback is the dual control of water in the Railway Belt. It is suggested that the Dominion Government transfer its right of control to the Provincial Government and that the latter should adjudicate on the claims of record holders putting all on the proper basis." Another quotation from the schedules of this district is as follows,—"Seven persons in this neighbourhood were absolutely ruined for want of regulation of water supply. The first record is taking it all and letting it run to waste rather than let others have a share. Four farmers have left their farms and others have actually no crops. Investigation would show absolute ruin to a fertile district through want of official water distribution. The strong man is utterly regardless of his neighbour." One quotation from the report for Kamloops district is as follows,—" The conservation of water at the source of supply and official distribution would fully develop a very fertile valley." Another quotation referring to the same district mentions "The lack of legal control of water supply, administration of regulations so imperfect that settlers with much later records have monopolized all the water. The judgment given in recent lawsuits to enforce record rights bids fair to practically ruin this ranch. The Provincial Governments were held to have no jurisdiction and all records they issued during the last twenty-five years are null and void."

Forest fires denude the forests and will affect the water supply in the near future. Many of the farmers suggest that steps be taken

by the Government to clear the land and that a charge, extending over some years, be made to pay for it. A number suggest that more drastic measures be taken regarding the supervision and control of seed grains and grass seeds at points of production and sale.

Vancouver Island and Lower Mainland

The farms vary greatly in size. Very few of the farmers grow a large amount of grain. Dairying is the principal industry on the farms visited on Vancouver island, and there is great diversification on the farms visited on the lower mainland. Very few follow the short rotation of crops. Where a rotation is followed, it is usually a rotation of hoe crop, grain, followed by hay and pasture for several years. Most of the seed grain is cleaned by the fanning mill. Manure is used on roots, orchard and grass land. A considerable number of the farmers use chemical fertilizers on roots and vegetables. Many of the worst weeds are found. The farmers are complaining about the weeds being imported in mill feed, seed grain and grass seed. Very few pests are reported. The majority of the farmers treat their seed grain for smut. A number of the farmers have gasoline engines, but very few have windmills. Many of the farmers get their water supply from springs. A number have water piped to the house. There are more houses in this district with water on tap and with baths than in any other district visited. The drawbacks mentioned are scarcity of help, the difficulty of getting good milkers, weed seeds in seed grain and large middlemen's profit.

INFORMATION SCHEDULE

The following are half-size reproductions of the pages of the question schedule used in the collection of the foregoing information:

COMMISSION OF CONSERVATION

AGRICULTURAL SURVEY, 1911

No.....

1. Lot..... Con..... Township..... County.....Province.....
Name of farmer.....P. O.....
Under field crops.....acres, Grain.....acres.
In permanent or unbroken pasture..acres. Hoe crop.....acres.
In woods .....acres. Hay and pasture.acres.

ROTATION, SEED AND MANURE

2. Does he follow a systematic rotation of crops?.....
Does he practise any of the following rotations?.....

1.	2.	3.	4.	5.
Hoe crop	Hoe crop.	Hoe crop.	Hoe crop.	
Grain.	Grain.	Grain.	Grain.	
Hay.	Hay.	Grain.	Grain.	
	Pasture.	Hay.	Hay.	
			Pasture.	

State in above columns kinds of crops in rotation.....
3. Does he use seed selected in any systematic manner?.....
If not, why not?.....
Does he sow specially cleaned seed grain or ordinary feed grain?....
State names of varieties sown:
Wheat.....
Oats.....
Barley.....
How many acres seeded to clover this year?.....
Pounds of seed sown per acre of red clover?.....Alsike?.....
If he grows alfalfa, how much, when and how sown?.....
How does the yield of crops from his farm compare with ten years ago?
With twenty years ago?.....
4. Does he use manure?.....On what crops and rate per acre?...
Does he use artificial fertilizers?.On what crops and rate per acre...
How does he apply manure?.....
What care is taken to prevent waste?.....

WEEDS, INSECTS AND DISEASES

No.....

5. Which weeds are most prevalent? Before name of weed the letter (A) means few, (B) numerous, (C) very bad;
(N) new to farm, (I) increasing, (D) decreasing within five years.

A, B C.	N, I. D.		A, B, C.	N, I. D.	
1.	....	Barnyard Grass.	18.	....	Mustard.
2.	....	Bindweed.	19.	....	Night Fl Catchfly.
3.	....	Bladder Campion.	20.	....	Orange Hawkweed.
4.	....	Blue Burr.	21.	....	Ox-eye Daisy.
5.	....	Blueweed.	22.	....	Pigweed.
6.	....	Canada Thistle.	23.	....	Ragweed.
7.	....	Chickweed.	24.	....	Rib Grass.
8.	....	Chicory.	25.	....	Shepherd's Purse.
9.	....	Couch Grass.	26.	....	Sow Thistle.
10.	....	Darnel.	27.	....	Stinkweed.
11.	....	Golden Rod.	28.	....	Tumbling Mustard.
12.	....	Green Foxtail.	29.	....	Wild Buckwheat.
13.	....	King Devil.	30.	....	Wild Carrot.
14.	....	Lady's Thumb.	31.	....	Wild Flax.
15.	....	Lamb's Quarters.	32.	....	Wild Oats.
16.	....	Mayweed.	33.	....	Yarrow.
17.	....	Milkweed.			
....	....	.....	....	....	.....

State causes responsible for foregoing.....
.....

6. What insect pests or plant diseases injure his crop? Use letters (A) (B) (C) and (N) (I) (D) in same sense as for weeds.

A, B C.	N, I. D.		A, B, C.	N, I. D.	
1.	....	Codling Moth.	8.	....	Apple Scab.
2.	....	Cut Worm.	9.	....	Oat Smut.
3.	....	Potato Beetle.	10.	....	Potato Blight.
4.	....	Pea Weevil.	11.	....	Potato Rot.
5.	....	Turnip Aphis.	12.	....	Potato Scab.
6.	....	White Grub.	13.	....	Rust.
7.	....	Wire Worm.	14.	....	Turnip Clubroot.
....	....	.....	15.	....	Wheat Smut.
....	....	.....	....	....	.....
....	....	.....	....	....	.....

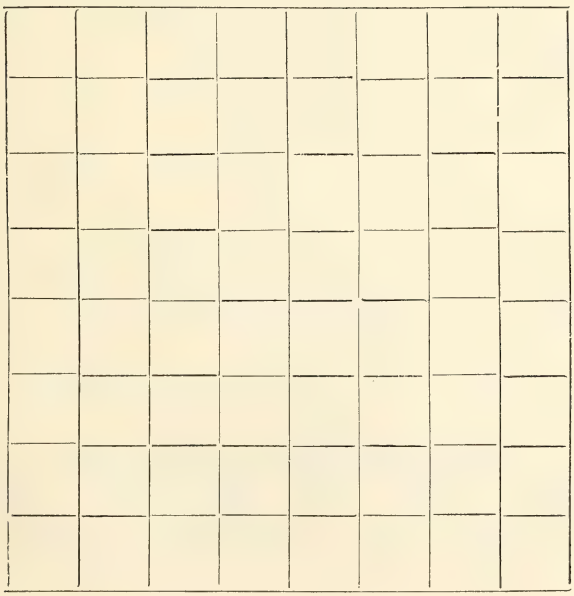
Crop	Pest or Disease	Estimated Loss
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Is seed grain treated for smut?.....

FUEL, POWER AND WATER

No.....

7. Is the fuel wood or coal?.....
   If wood from farm is used, how many years at present rate of consumption will the supply last?.....
   .....
   How many acres of the unbroken pasture would be more profitable if forested and utilized as a woodlot?.....
   .....
   Has any planting been done, if so with what results?.....
   .....
   .....
8. What motive powers are used on the farm?.....
   House and barn work.....
   Field work .....
9. Is the water supply for house use obtained from well, spring, or stream? .....
   Where is water for stock obtained?.....
   State distance, in feet, of well or spring from house, stable, or manure dump .....
   House supply?..... Stock supply?.....
   How is water conveyed to house?.....
   Is there water on tap in the house?.....
   Is there a bathroom and W. C. in house?.....
10. Plot in diagram the positions of well, spring, or stream, and the farm buildings; and indicate by arrow heads the general slope of ground in relation to the well. The area below may be taken at 400 feet square. An arrow one inch long indicates a very gentle slope (1 in 50); an arrow half-inch long a steep slope (1 in 20); an arrow a quarter of an inch long a very steep slope (1 in 5). (Thus indicates a very gentle slope downwards in direction of arrow head as 1 in 50). (The rectangles are each ½ an inch square).



INSTANCES OF GOOD FARMING

(Particularly as to Rotation, Crops and Fertility)

TOTAL POINTS: 1500 No.....

		POINTS Possible	Awarded
I. 500	PLAN OF ROTATION		
	Legumes and grasses.	100	.....
	To keep down weeds.	100	.....
	Control of moisture.	100	.....
	Distribution of labour.	100	.....
	Quality of seed.	100	.....
II. 500	CROPS		
	Stand vigor and uniformity.	100	.....
	Yield per acre.	100	.....
	Freedom from other grains.	100	.....
	Freedom from weeds.	100	.....
	Freedom from diseases and insects.	100	.....
III. 200	PRODUCTION AND CARE OF MANURES	200	.....
IV. 300	EQUIPMENTS		
	Water supply and sanitation.	100	.....
	Care of machinery and implements	100	.....
	Care of fuel supply.	100	.....
	TOTAL		

Does the farmer indicate any drawback or menace to profitable continuation of any branch of his present system of farming?.....

.....

.....

In what branch of farming does he specialize?.....

.....

Collector's remarks regarding above.....

.....

.....

.....

.....

.....

.....

Dated at .....191....

.....

Collector

STATISTICAL RESULTS OF SURVEY

The following tables give detailed figures relating to the conditions found in the localities of the Survey for 1911.

Agricultural Survey, 1911

I. AREAS

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
No. of farms	100	100	100	200	300	100	87	85	140
Total acreage	16,893	10,992	13,991	30,552	33,340	39,999	35,303	22,713	62,428
Field crop acreage	5,958	8,220	6,836	19,469	24,634	23,045	24,616	16,222	14,761
Percentage of total area.....	35	74	49	64	74	70	70	71	24
Grain acreage	1,072	2,508	1,750	5,640	10,917	26,0 3	24,149	12.855	3,652
Percentage of field crop area	18	30	25	34	44	93	98	78	25
Hoe crop acreage .	277	516	249	806	3,126	205		89	1,263
Percentage of field crop area	5	6	3	4	12	0.62	Less than ½	0.54	9
Hay and pasture..	4,609	5,196	4,837	12,014	10,596	1,757			9,846
Percentage of field crop area.....	77	62	71	66	43	6	1.8	21	67

II. ROTATION OF CROPS

(Figures given as percentages.)

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
			No. 1=3	No. 2=1	No. 1=20	No. 1= 2	No. 3=50	No. 1=19	No. 1=5
			No. 2=9	No. 3=2	No. 2=24	No. 3=50	No. 1=50	No. 2= 2	No. 2=6
			No. 3=1	No. 4=1	No. 3= 5			No. 3=20	
					No. 4= 4				
Systematic rotation.....	8	.	13	4	53	52	100	41	11
								None with clover	
Ditto on small part of farm	19	4	..	..	..	..		..	..
Irregular rotation.....	17	90; long rotation	47	17	30	21	..	..	..
No rotation...	47	..	40	76	17	27	..	32	37

KEY TO NUMBERS IN "SYSTEMATIC ROTATION" COLUMN OF FOREGOING TABLE

Prairie Sheet			Ordinary Sheet			
No. 1	No. 2	No. 3	No. 1	No. 2	No. 3	No. 4
Wheat Wheat Fallow	Wheat Oats or Barley Fallow Pasture	Wheat Wheat Oats or Barley Fallow or Hay	Hoe Crop Grain Hay	Hoe Crop Grain Hay Pasture	Hoe Crop Grain Grain Hay	Hoe Crop Grain Grain Hay Pasture

Agricultural Survey, 1911

III. SELECTION OF SEED

(Figures given as percentages.)

	N.S.	P.E.I.	N.B	Que.	Ont.	Man.	Sask.	Alta.	B.C.
C. S. G. A. or Systematic	..	1	1	32 per cent select best field	15 per cent select best field	54 per cent select best field	..	..	3
By purchase...	11	..	few	10	5	6	..	..	49
By fanning mill	79	96	59	85	91	92	100	100	16
None.....	..	..	10	1	..	..	..	..	..
Feed grain.....	8	3	10	..	..	1	..	..	..

IV. CLOVER

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Percentage of grain area seeded to clover.....	60	57	50	74	45	..	..	..	42
Pounds of seed per acre.....	5	3	4	4½	8	..	..	..	9

V. ALFALFA

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask	Alta.	B.C.
Percentage of farmers growing alfalfa	10	7	none	6	25	none	4small plots	2	28
No. of acres.....	Exp. plots	Small plots	.	Small plots	300	..	..	Exp. plots	321
Average number of acres on each farm	..	*	.	.	4	..	..	..	16

*A few have tried growing alfalfa, but without success.

Agricultural Survey, 1911

VI. COMPARISON OF YIELD OF CROPS NOW WITH TEN AND TWENTY YEARS AGO

(Figures given as percentages.)

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta	B.C.
WITH 10 YEARS AGO:									
No. reporting increase	49	51 av.inc.=12%	24 av. inc.=12%	39	24 av. inc.=50%	none	4		13
No. reporting no change	21	32	16	14	35	32	40	30	6
No. reporting decrease	..	15 av. dec.=12	12 av. dec.=10	4	4 av. dec.=25%	46 av. dec.=11%	5	2	2
WITH 20 YEARS AGO:									
No. reporting increase	..	Few with slight incr'se	15 av. inc.=19%	22%	25 av. inc.=2%	none	..	..	.
No. reporting no change	17	19	18	12	20	9	..	..	.
No. reporting decrease	..	15 dec. of 15	14 av. dec.=15	3%	3 av. dec.=50%	50 av. dec.=14%	..	..	..
	A number, being new to farm, could not report		The figures would have been more complete had all reported		10 per cent. were newcomers and could give no accurate estimate				

VII. NAMES OF VARIETIES

(Figures given as percentages.)

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
No. knowing names of varieties of wheat, oats and barley.....	32	70	15	15	67	29	70	50	24
No. knowing part of names.....	67	30	45	51	21	69	26	50	26
No. not knowing any of the names	1	none	30	32	3	1	3	none	24

Agricultural Survey, 1911

VIII. MANURE

(Figures given as percentages.)

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
No. using farm manures	100	100	100	100	100	Most farmers	78% use some	70	88
No. giving no care to manures	22	64	44	76	44	77	The majority	..	55
Very little care	11	..	15	..	3	..	..	..	..
Fair care	59	34	29	20	25	14	10	5	18
Good care	8	..	..	4	15	..	11	..	..
No. burning the straw	..	..	..	..	..	16 4% burn some	..	..	..
No. burning the manure	..	..	..	..	..	..	22	Many	..

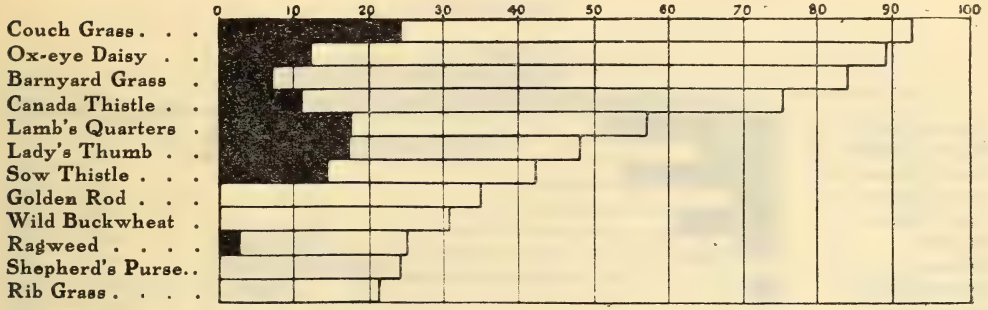
X. WOODS

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Total acreage of farms surveyed	16,893	10,992	13,991	30,372	33,340	39,999	35,303	22,713	62,428
Acreage in woods	6,312	2,075	5,298	7,410	4,120	1,623	152	413	7,849
Per cent. of total area in woods	37	18	38	24	12	4	44	18	12
No. of years supply will last	76% have indef. supply; 15% for 15 yrs.	14% have indef. supply; 32% for 25-50 yrs 35% for less than 25 yrs.	59% have indef. supply; 13% for less than 25 yrs.	64% have indef. supply; 16% for short time; 9% for 25-50 yrs.	38% have indef. supply; 26% less than 25 yrs.	20% have indef. supply; 24% for short time	11% have indef. supply	20% have indef. supply	30% have indef. supply; 17% for 10-25 yrs. 9% for 25-50 yrs.

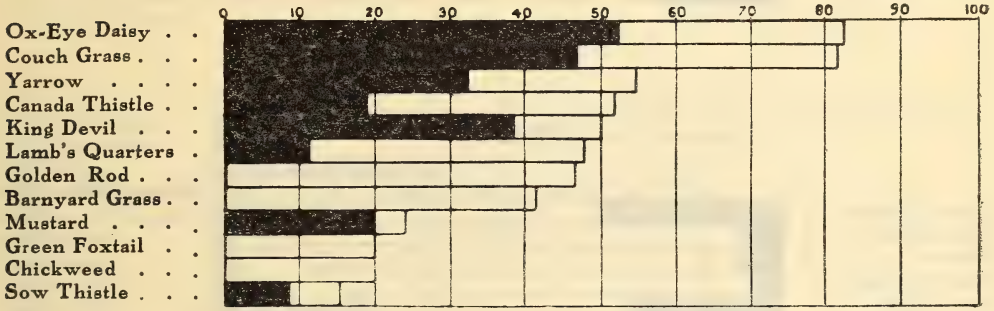
PREVALENCE OF WEEDS IN CANADA

(As shown by Agricultural Survey of the Commission of Conservation, 1911.)

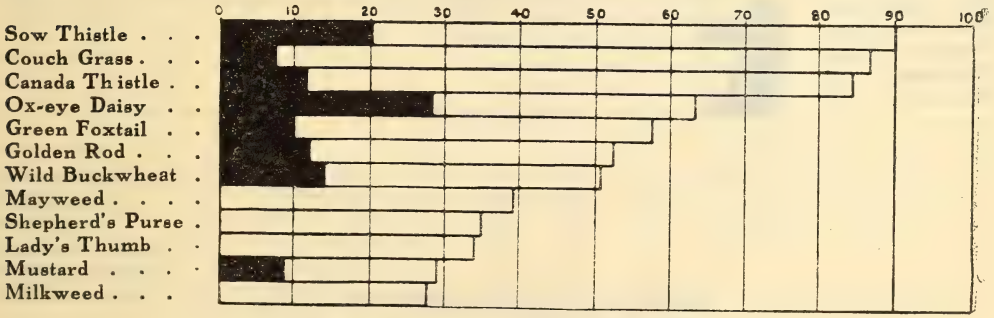
NOVA SCOTIA



NEW BRUNSWICK



PRINCE EDWARD ISLAND



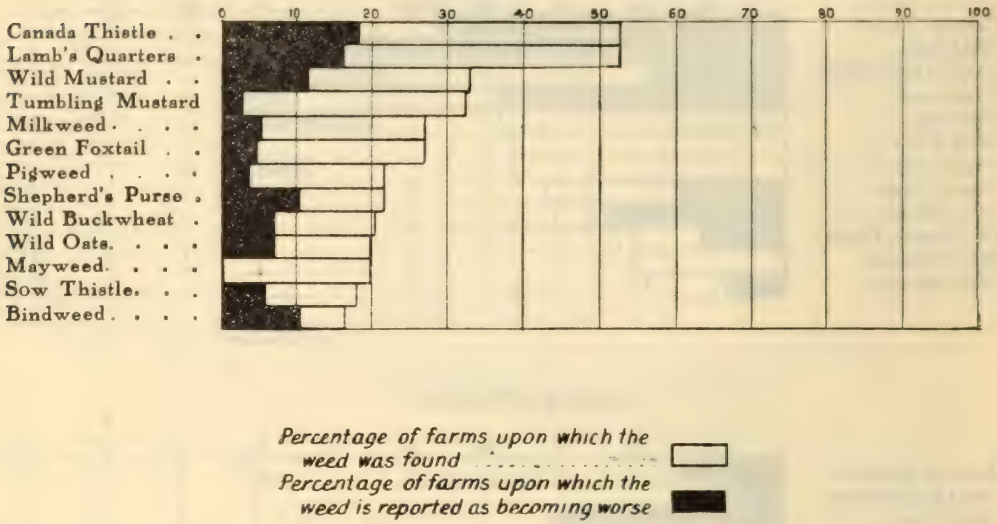
Percentage of farms upon which the weed was found

Percentage of farms upon which the weed is reported as becoming worse

PREVALENCE OF WEEDS IN CANADA

(As shown by Agricultural Survey of the Commission of Conservation, 1911.)

BRITISH COLUMBIA



XI. WATER SUPPLY FOR THE HOUSE

(Figures given as percentages.)

	N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
No. obtaining water from wells.....	66	92	58	56	98	93	79	70	21
No. from springs...	30	2	34	23	2	..	3	..	24
No. from streams..	3	6	3	15	..	..	..	2	32
No. from town supply.....	1	..	..	4	..	..	..	..	..
No. conveying water to house by hand	44	87	58	36	78	65	74	90	25
By pipe.....	40	..	31	29	9	..	2	..	57
By pump.....	18	12	..	33	4	23	..	..	6
No. having water on tap in house.....	37	2	12	42	14	1	3	..	56
No. having bathroom and W.C.	8	2	5	14	12	1	7	..	22
No. having bathroom only.....	..	..	..	..	2	3	..	..	25

DISTANCE OF SOURCE OF SUPPLY FROM BUILDINGS OR OTHER SOURCE OF CONTAMINATION

(Figures given as percentages.)

N.S.	P.E.I.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
15 ft. and less =19	Less than 5 ft =8	Less than 10 ft.=8	In or against house=12	In or close to house=10	Under house =23	From 10-25 =19	Less than 25 ft.=2	In or close to house=3
From 15-50 ft =22	From 5-10 ft.=20	From 10-50 ft.=23	From 10-25 ft.=12	Less than 10 ft =24	At Stable =2	From 25-50 ft.=30	From 25-50 ft.=14	From 10-25 ft.=2
From 50-100 ft.=13	From 10-25 ft.=31	From 50-100 ft.=11	From 25-50 ft.=11	From 10-50 ft.=44	Less than 20 ft.=17	From 50-100 ft.=7	From 50-100 ft.=21	From 25-50 ft.=4
From100-500 ft.=17	From 25-50 ft.=18	Bal. reported over 100 ft.	From 50-100 ft.=17	Bal. reported from 50 ft. to long distance	From 20-50 ft.=22	In house=2		From 50-100 ft.=8
Over 500 ft. =23	In house=13		Bal. reported over 100 ft.		Bal. reported over 50 ft.	Bal. reported long distance		Longdistance =45

Housing and Town Planning

By

C. A. Hodgetts, M.D., L.R.C.P., Lond.

Medical Adviser of the Public Health Committee of the Commission of Conservation

WE have been devoting much attention in Canada during the past few years, to that omnipresent plague, tuberculosis; but as a nation, we should, and must, do much more. While endeavouring to assist the sufferer and prevent infection, we have been doing nothing to better the homes of our people. Consumption is largely a homebred disease, and it logically follows that if we are to obtain any permanent reduction of its ravages, we must see to it that each home is a health resort to which a cured consumptive may return after education in a sanitarium, there to live out his life in the most sanitary environment.

Housing and Tuberculosis

It is from the standpoint of the health of the people that the all-important question of housing must be approached. Housing conditions should be regulated and supervised in a strong and almost imperative manner by a central national health authority. By such means much may be done towards conserving the nation's most valuable asset.

Urban Life in Canada

It is quite true that Canada has not the dense urban population to be found in the older lands of Europe, or in the United States. We have unsanitary conditions, however, which are not a credit to us, and which simulate very much those found in Great Britain and Germany. In those countries, efforts have been made for some time to eradicate these evils, while we, up to the present, have failed to recognize them, and therefore have made but faint efforts either to prevent or remove them. That we should have unsanitary conditions in our cities similar to those prevailing in Europe may at first sight seem strange. But when it is remembered that we have derived most of our inspirations and ideas of urban life from older countries, it is not so surprising that many European methods have entered into the

housing of our people and the planning of our cities. Indeed, it can be seen that, with but slight modification of the methods there so common, we have simply adapted them to Canadian conditions.

The early French settlers built in Quebec upon the lines of old French towns similarly situated. Montreal has followed upon both French and Scotch methods, but Toronto is planned more on an English model. Winnipeg has improved in its town planning over any of the older cities of Canada, and, unconsciously perhaps, adopted more generous lines in its town layout and development.

Errors in Canadian Town Planning

It is only some forty-five years since Canada's era of national development began and rapid indeed has been the growth of the older centres of population. Innumerable cities and towns have also grown up, particularly during the last two decades. Largely owing to increased immigration, the development of towns has been chaotic, and tens of thousands of so-called houses have been thrown together, which must, sooner or later, be condemned for sanitary reasons. As for town planning, there has been none. The speculative owner of property has, with the aid of the provincial land surveyor, mapped out streets and lots so as to make the most for the owners, while no thought or heed has been given to the question of how the work should be done in the best interests of the health or convenience of the community. As a result, we find that already cities and towns upon acquiring additional areas, have been put to expense in righting mistakes which should never have been permitted—errors in the manner of planning roads and streets, the failure to provide parks and playgrounds, and the non-enforcement of proper restrictions in respect to the height of buildings, and the area to be built on.

That conditions such as these should grow up in a young country without the people becoming conscious of them, is not strange, but the time is come when we can no longer plead ignorance. Fortunately, thus early in our national life, we have come to realize, at least in part, some of our errors. We may not be able to right all these mistakes, yet we may, before property in the centres of our larger cities becomes too congested and valuable, make provision that, in the near future at least, some of the errors may be remedied at the minimum cost to the ratepayer.

It is most important that the work should be undertaken at once, since the tremendous tide of immigration is constantly bringing a large number of town dwellers from all portions of Europe,

who gravitate to the cities and towns. This settlement in cities has already led to overcrowding in the older centres, and to the development of shacktowns in their environs. The increased demand for houses has bred an army of land speculators and jerry builders, who are a detriment to the community and a curse to the mechanic and artisan classes.

In comparing the results obtained through the methods adopted to meet the difficulties in European countries, one is struck with the great difference in present day conditions in Great Britain as compared with Germany.

Housing in England

In England, much good work has been accomplished in the old and crowded centres through the activity of the local authorities. Unsanitary houses and areas have been removed and some progress made in reconstruction. This has been carried out largely at the expense of the municipalities, the latter, in many instances, acquiring the land. Perhaps the most marked changes in housing in Britain have been brought about through the activity of private enterprise. Those interested have planned and built upon areas in town suburbs which have been privately owned, controlled by companies or by large employers of labour. In each instance, the promoters have endeavoured to plan and to work upon the most up-to-date methods, looking for an interest yield upon their investments of from four to five per cent., and not expecting speculative profits such as we strive for in Canada.

Examples of rehousing are seen in all the large centres of Britain, such as Glasgow, Liverpool and Birmingham, while housing on the garden-suburb plan is seen in Port Sunlight and Bournville. The latter, in both instances, are the work of large employers of labour. Hampstead Garden Suburbs, Harborne Tenants and other similarly designed suburbs are worked out on the co-operative principle as advocated by such well-known workers as Mr. Henry Vivian and his colleagues. The most interesting and illuminative model for our new Canadian towns is to be found in Letchworth Garden City

"Sky Scrapers"

In comparing the larger cities of Great Britain, Germany, Belgium and Austria, with those of Canada, and the United States, one is struck with the absence in Europe of what is known on this continent as the "sky scraper." This rank and weedy growth of the buildings in the commercial districts of our cities is producing a condition of overcrowding affecting many thousands of our people during the working

BIRD'S EYE VIEW, HAMPSTEAD GARDEN SUBURB, SHOWING ROAD PLANNING, HOUSES WITH GARDENS AND PUBLIC SQUARE

hours, which will prove disastrous to the health of those employed therein. Why should Montreal, Toronto and Winnipeg have sky scrapers? What is there to justify the modern towers of Babel erected by greedy corporations? Monstrosities such as these would not be permitted in Great Britain or Germany, and there is nothing to justify their existence here. They are nothing more nor less than nuisances, and should be treated as such, a menace alike to the health of those who are compelled to work in them, as well as to those who, unfortunately, fall within their overpowering and sepulchral shadow. There is no more reason that this unsanitary condition should continue than that we should revert to the old style of factory buildings which have been supplanted by those of the most modern sanitary construction.

That the evil of high buildings is likely to be perpetuated, however, is evident from the statement made by Mr. Ernest Flagg, in a paper read at the third National City Planning Conference at Philadelphia in 1911. In referring to public buildings, he said, in part:

"Should these buildings, then, be low and massive, of a different type and of a different kind of architecture from the surrounding structures? Or should they out-Herod Herod and dominate them in height and extravagance of design? A true architectural style is capable of every shade of expression, from the most light and fantastic to the most majestic and dignified.

"But the time will soon come when all this will be changed, and when that time does come, I predict that public buildings in the United States will be carried to such amazing heights, that the tallest commercial building will be dwarfed by them. I have no doubt that heights approximating 2,000 feet will be reached within the next twenty-five years, for I see no reason why such heights should not be practical."

Viewed from the sanitarian's standpoint, such a statement from such an authority must meet with the strongest condemnation, as the emanation of a mind as freakish as the proposition is dangerous. Equally freakish is the opinion expressed by another eminent American city-planning authority,* who, at the same Congress, spoke as follows:

"There is a popular belief that city planning will solve the housing problem. Nothing could be further from the facts. The housing problem as we know it in America is largely a sanitary

*Mr. Lawrence Veiller.

problem. It is chiefly the problem of good municipal housekeeping.

"That city planning will not solve the housing problem, is readily to be seen when one considers the experience of those cities in America which have developed city plans. Notwithstanding its almost ideal plan, Washington has the unenviable notoriety of possessing some of the worst slums in the entire country.

"When, however, we come to consider one phase of the housing problem, a phase which fortunately has as yet developed in but few American cities, viz., the problem of land overcrowding or congestion, we find there is a deep and vital connection between city planning and housing reform.

"What are the points, it may be asked, at which city planning touches the housing problem? There are but three—the regulation of the height of the buildings, the depth of lots, and alleys—.... ..... For our large cities and for our industrial towns, I believe lots should not exceed in depth 25 or 30 feet. (No front or back yard).....It would be far better in most cities if the houses were built solidly against each other.

"The faulty conditions of housing and town planning in Great Britain and Germany with their attendant evils of squalor, dirt, poverty, crime and degeneracy have all been clearly set forth in the writings of public health officers and social workers. And a visit to the centres of population in these countries reveals what a burden rests upon the people to remedy them and to prevent their continuance in the highest interests of their civilization."

The conditions under which people live in Great Britain, as well as in Continental countries, differ in so many respects from those of our own country, that it would be manifestly unwise to follow the housing details too closely. We can, however, profitably adopt many of the general principles.

Height of Buildings in Europe

In this connection, it may be said that it is essential that a fixed relationship should exist between the height of buildings and the width of the street. In England, the tendency has always been to prevent the erection of high buildings. The London Building Act of 1894 requires that on a street, for instance, 49 feet 6 inches wide, the buildings may not be higher than the street is wide, whereas a street of 50 feet may be lined with buildings 80 feet in height. On the Continent also, it is made essential in the framing of building by-laws, that due consideration be given to the height of buildings in relation to the width of the streets. Karlsriche fixes the height of buildings at one and a quarter times the width of the street; Rome, at one

and a half times; Berlin permits the front wall to be equal in height to the width of the street, with a maximum, however, of about 72 feet. In Paris, the height is proportionate to the width of the street.

The following is the schedule of maximum heights for the central part of London:*

Maximum Heights of Buildings, London, Eng.

Width of Street (Feet)	Width of Street Height to Relation of	Approximate Lowest Building (Feet)	Approximate Highest Building (Feet)
40-60	1.0	40	60
60-80	1.125	67	90
80-100	1.25	100	125

The cities of the United States, on the other hand, as a rule, place no limit to the height of buildings or the ratio of their height to the width of the streets. In New York, houses other than public and mercantile, may be 150 feet in height on streets exceeding 79 feet in width, while in streets of less width, they may be as high as 125 feet.

Here is a point where the aesthetic and the hygienic do not agree, for, from the former standpoint, high buildings are less suited for a broad thoroughfare than a narrow one. The question is, which should decide? There can be no doubt but that the health of the community is of paramount importance.

TOWN PLANNING

The primary objects of town planning may be considered under three heads:

1. To encourage and facilitate thorough co-operation in the providing of housing accommodation for town dwellers whereby they will have sufficient light, air and space.

*Mr. James S. Gibson in Journal of the Royal Institute of British Architects, December 24, 1907.

2. To ensure the exercise of foresight in reserving plenty of space for the development of main thoroughfares when required.

3. To take into account everything that helps to make town life worth living.

Essentials of Town Planning

It will thus be seen that town planning is of vital interest to the whole community, and the questions involved are more numerous and complicated than the mere building of a house. The various constituent parts of a modern town have to be considered and arranged in such a manner that they will form an harmonious whole, no matter how great that whole may ultimately become. There must be a co-ordination, otherwise the results will be disastrous.

These constituent parts of a town or city may be divided into the following groups or areas:

(a) Manufactories.
(b) Warehouses.
(c) Offices.
(d) Shops.
(e) Public parks, open spaces and playgrounds.
(f) Public buildings.
(g) Private dwelling houses.
(h) Streets and highways, and their construction.
(i) The means of communication.
(j) The sewerage and water systems.

Having in view all the varied interests, a plan for town extension contemplates and provides for the development as a whole of every urban, suburban and rural area that may be built upon within from thirty to fifty years. Wide streets or avenues must be provided, sufficient to meet the demands of the main traffic, and for this purpose they must extend from the centre to the outskirts, streets of narrower width being provided for ordinary traffic and for residential purposes.

Speaking on this subject, an English writer says:

"The first requirement is wide main thoroughfares, and if forethought is exercised, it is comparatively easy and inexpensive to make these main thoroughfares pleasant and healthful; healthful, because they are wide, and therefore act as long ventilators for the town, and pleasant as well as healthful, by planting trees, which are most useful by their property of absorbing noxious gases, as well as being pleasant to the eye.

"In London, the greatest city in the world, the necessity for wide main thoroughfares was not recognized by public opinion until it was too late to provide them, except at overwhelming expense, due to the enormous cost of compensating the owners of the buildings that had to be demolished. In provincial towns, it is not yet too late to provide for the wider distribution of our population, because expensive buildings have not yet been erected very far from the centre."

Industrial and Business Sections

The district for factories should be on the opposite side of the town to that from which the prevailing winds come, and these should be accessible by both rail and water communication, where the latter exist. The warehousing district should be placed convenient to the factories, the business offices, in the centre of the town where the land is dear.

Public offices should be located in commanding positions, not only for the sake of the time and money saved to the public by the convenience of their positions, but because they should be dignified reminders of the corporation's existence, and act as inspirations to the patriotism of the people.

The main thoroughfares are the natural positions for shops, as it is there that pedestrians pass to and fro. The occupation of commanding positions is a permanent advertisement for the proprietors who are prepared to pay for it.

Residential Sections

The residential portions of the town should be divided into districts which should be graded as to class of houses. The distance between the houses should be greater the further they are removed from the centre of the city or from the main arteries of travel. The character of the road itself should be determined by the amount of traffic on it. In those streets where traffic is light and a sufficient distance is maintained between opposite lines of houses, narrow and inexpensive roadways or drives should be allowed in order to keep down the cost of estate development.

Public parks, playgrounds and open spaces should, as far as possible, be placed on cheap land; for it is a waste of money to use valuable frontage on a main thoroughfare as park land. A park is much more valuable when placed away from the noise and bustle of business thoroughfares: it should be considered as a place for rest and recreation. It is particularly important that playgrounds

for children be located on side streets or at the back of houses, where the little ones can play in safety away from the street.

It is not essential that all the details of a town-planning scheme should be definitely and unalterably fixed upon. On the contrary, it has been found by experience that this is unnecessary, as it often proves a hindrance to the development of the scheme. In the long run, too, it is costly by reason of reduction in the value of land consequent upon alterations which often entail the payment by the ratepayers of heavy compensation to the owners. This can be avoided if the general skeleton plan be adhered to, details being worked out as town development goes on.

One of the great difficulties met with everywhere in respect to the housing of the poorer people is the fact that they cluster around our city centres where land is dear, while the wealthy live on cheap land. To house this class properly in the outskirts should be one of the aims of town planning. This consideration leads up to the equally important one of cheap and rapid transportation for them to and from their work, as well as from one part of the town to the other.

In a comparative study of the question of town planning, one is struck by the different manner in which it has been approached and dealt with in different countries.

In Europe, the work was begun, and is continued with the object of improving the environment of the individual, to better him physically and morally and fit him for his position as a unit in the nation's life, thereby overcoming that degeneracy which decades of unsanitary housing had wrought upon its town dwellers. The work has been taken up from the health standpoint and mainly on the initiative of the medical health officers. With this object in view, it naturally follows that the measures taken would be of a legal character. Progress may have been slow, but it has been of such a character as to be most illuminative to Canadians.

Town Planning in Germany

In Germany, town-planning schemes are made for the future extension of even small towns, as well as the larger cities. Architects, health officers, surveyors, sanitarians and engineers of the highest standing are consulted, as well as the land owners themselves. The plans are subjected to the severest criticism with a view to ensuring adequate provision for the requirements of health, convenience, employment and pleasure. The appeal to a higher authority protects the interests

of all concerned. The municipal authority makes plans for all the land within the corporation bounds, no matter to whom it belongs. When a plan has been made it is shown publicly for a given time, and any person interested may object to any of the arrangements respecting his own land, and these objections must be considered. The determining consideration for the municipal authority is the good of the whole community.

The city of Ulm in Wurtemburg, close to the Austrian frontier, may, without prejudice to other cities of Germany, be quoted as one where marked activity has been shown by the municipal authorities. This city secured from the Government the site of the fortifications, and is laying it out to the best advantage of the citizens. It has also arranged its factory district so as not to inconvenience the rest of the city, while giving, at the same time, every encouragement to manufacturers by providing facilities.

Town Planning in Austria

The laws of Austria are similar in character to those of Germany and are administered by a central authority. Its beautiful capital, Vienna, is a most striking example of what wise foresight, co-operation and comprehensive control on the part of the authorities can achieve in the way of securing permanent economic advantages to its citizens. Some fifty years ago it was decided to remove the old city walls. The space formerly occupied by the old city walls has been acquired and used for a fine wide ring street, with gardens, planted with trees, located in appropriate positions. The results of this have been so satisfactory in every way that the city has purchased a second belt farther removed from the city centre, with the object of making a second ring. All the improvements made are for the health, convenience and beautification of the city.

Town Planning in Belgium

As far back as 1836, the kingdom of Belgium, with its densely populated cities and towns, gave powers to communal councils, for "fixing the great highways and general plans of towns, the agglomerated parts of the rural communes, the opening of new streets and the widening of old ones as well as their suppression." A city council, therefore, may determine the width and the direction of each street; it may widen, narrow or suppress it altogether, and may create as many streets as it thinks proper. All communal decisions must be approved of by the king, who, after instituting a searching enquiry, issues a royal decree to legalize the decisions.

The results of the continental methods are seen in the rows of magnificent tenements located on fine broad streets or avenues. These are costly in construction, each block having inside courtyards. Magnificent parks and gardens have been arranged in most of the towns and cities in such a manner as to form with their boulevards, a chain of breathing places for the inhabitants. But this Continental method of canning families like sardines in a box and then warehousing them in a wholesale manner, while it may look fine and grand, is not conducive to health or longevity, and Continental housing authorities are looking to England for inspiration and practical suggestions.

Referring to these conditions in Germany, Professor Eberstadt recently stated that:

"Germany is tired of the unnecessarily expensive streets which implies costly building sites, whereon are erected the rows of large tenements, and a movement is being made to overcome this great difficulty, and the leading authorities in that country fully realize the benefits of what may be called the English system of the individual house."

Already garden suburbs may be seen in different parts of Germany, and they are extending rapidly.

Town Planning in the United States

In the United States, the work has partaken of the character of the people. Efforts have been made to disseminate ideas concerning the creation of civic centres, for the establishment of elaborate systems of parks and playgrounds, for the creation of the "city beautiful," and for recreating the areas to be developed. Naturally the work has been of an advisory nature, often undertaken voluntarily by bodies of citizens. The plans have been formulated chiefly by expert architects, landscape architects and engineers. There has been a washing and a decorating of the outside of the municipal platter—a good thing in its way—while leaving the inside a slumdom, and the suburbs a paradise for the land speculator. In the United States they build skyscrapers which would not be permitted in any other civilized country, except, I am ashamed to say, in Canada. In this manner, thousands of workers are segregated in the most unsanitary of commercial buildings. Then parks are laid out miles away in which these workers may have the benefits of sunlight and fresh air, and thither are these people taken by underground or elevated railway—a not very satisfactory way of improving the health conditions of the people.

It is not meant by this comparison in any way to depreciate the work which is being done in such cities as Washington, Philadelphia, Chicago and Cleveland; for unmistakably it has accomplished something towards improving the life of thousands of city dwellers. But what I would urge upon the people of this country is that it would be unwise for us to be led away by what Civic Improvement, and other leagues have done in the United States. We have, no doubt, much to learn from them, and, in the drafting of our laws, can secure much information of a valuable character.

It must not be taken for granted either, that we should follow along the exact lines adopted by Great Britain, Germany or other countries. We have many and widely differing conditions which would make it, perhaps, unwise to do so. We can, however, take to ourselves the good things from these countries and adapt them to our requirements. Such a course will cause us to make a marked step forward at once, provided we proceed on the basis that the foundation of a nation's greatness is the home. We want a vigorous race of sound and healthy men and women. This desideratum can only be secured by an immediate and united effort to place upon the statute books of each province, laws dealing with town development, unsanitary houses and the improvement of the areas already built upon. But we must not stop at this. There must be power vested in some central authority to supervise and, if necessary, carry out work when required in the interest of the people of any community. It will be necessary that this central body shall have advisory powers and the various interests must be represented. In this advisory body, I would place first and foremost, a medical officer of health, and, associated with him, an architect, an engineer, a landscape architect and a legal adviser.

To permit of a better understanding of the present legislation in force in Great Britain the following very concise summary of the Housing, Town Planning, etc., Act of 1909, is given. The summary was prepared by Lord Pentland, Secretary for Scotland:

"Authorities were enabled to prepare plans, controlling future town extension. They would be able to secure that as each district develops, it should have its share of light and air, playgrounds, parks, recreation grounds, adequate sites for public buildings, and a limit to the number of houses per acre, so that if desired, each house might have its own garden, and the roads and avenues could be planted with trees. Such town extension plans might be made by a local authority....., either within its own area or in the

neighbourhood of its area. The Local Government Board might, if the plan is adopted and approved, suspend the operation of ordinary by-laws, and replace these with regulations providing for the limitation of the number of houses per acre, the height of the houses, the provision of open spaces, the width of the roads and for gardens. While compensation to owners of land for the limitation of the number of houses per acre was guarded against, compensation was to be given where owners can show that their property was injuriously affected by a town-planning scheme. Local Authorities .....might themselves undertake the development of estates by purchasing the land, making roads, leasing the sites, and even building houses themselves."

From the wording of Section 54, of the Act of 1909, it would appear that the Act was designed for the purpose of dealing with the growth of towns, by providing for the proper development of their outlying or suburban areas. The powers already conferred on local authorities in Great Britain for the improvement of portions of towns already built upon, can, at present, only be dealt with by calling into operation several statutes. As the law now stands in this particular phase of the subject, difficulties of an almost insurmountable character are frequently met with. Even where municipal authorities are willing to work, they are often seriously hampered by owners of condemned property declining to repair or rebuild the same, yet hold them at such prices as to make it prohibitive for the municipality to acquire them. It is the opinion of those most qualified to speak upon the subject that further increased powers are most desirable if town improvement in this direction is to be successfully and satisfactorily grappled with in that country.

HOUSING AND CITY PLANNING IN CANADIAN CITIES

Turning to our own country, we find that activity is manifest in some of our large cities as regards housing conditions.

Winnipeg

The first to take any active measures was Winnipeg, the municipal council passing the Tenement House by-law in November, 1909. Most of the provisions of this by-law were subsequently incorporated in the Public Health Act of 1911. In the main, these provisions are not retroactive and only apply to buildings intended as tenement houses. Referring to one- and two-roomed dwellings, which do not come under the by-law, the medical officer of health says:

"In Winnipeg, there are hundreds of houses so occupied, such occupation dating back to before the passing of the Tenement House By-law in 1909.

"The Department is making a vigorous effort to reduce the number of families occupying such houses by requiring alterations in their sanitary conditions.....

"When all is done, however, such houses remain unsatisfactory when viewed as tenements, and it is to the future we must look.....

"Once the existing conditions are tabulated and are available in black and white for the perusal of our citizens, we expect that public opinion will be ripe for a step forward in the housing problem.

"It will cost money—such reforms generally do come high. It may become necessary, for instance, for the City to show by practical example what can be done in the way of Municipal Lodging Houses erected and equipped on sanitary lines.....

"The main point is that we cannot stop at simply abating gross overcrowding—that is already nearly accomplished—but must be prepared to go much further and ensure that every place occupied as a dwelling within the City—no matter how humble it may be—is perfectly sanitary and a fit and proper place in which to bring up Winnipeg's most valuable asset—her children."

Manitoba Town-Planning Commission

But this is not all that has been done in Manitoba. A town-planning commission has been appointed which is turning its attention to the housing problem.

Toronto

In Toronto, the subject of housing has been dealt with by the medical officer of health in a report dealing with slum conditions in that city. The following are his conclusions upon this question so far as they relate to that city:

"First.—A good housing by-law with provisions for its adequate enforcement.

"Second.—We require suburban garden cities with rapid transportation facilities at single fare, such as they have in Germany and England, where the mechanic can get a ticket for 25 cents, good for six round trips, six miles from the heart of the City, or for 30 cents for nine miles. The assessed value of land in the Central District, that is, in St. Johns ward, is from $100,000 to $150,000 per acre; in the Eastern Avenue district, from $40,000 to $50,000 per acre, and in the Niagara district, from $30,000 to $40,000 per acre. From an economic standpoint, then, is it reasonable to think that the mechanic and the labouring class generally can be housed to as good an advantage on land of this value as on land in the suburbs which is assessed at from $1,000 to $2,000 per acre? It is gener-

ally conceded that a wage-earner should not spend more than one-fifth of his income on shelter.

"Third.—We require a proper scheme of city planning, and to securing control of the area surrounding the city for about five miles, the securing of an option on the required districts, or annexing the necessary territory. When compared with other cities of smaller population, Toronto yet requires to take in considerable territory."

Commenting upon this excellent report, Mayor Geary, in his inaugural address this year, spoke as follows:

"The able and conscientious report on the slum conditions and housing problem presented to the Local Board of Health, in July last, by Dr. Hastings, Medical Health Officer, is most enlightening. Replete with information as it is, its perusal will amply repay anyone interested, as we all should be, in the housing problem and the abolition of slums. The report demonstrates beyond the shadow of a doubt the existence of such conditions as call for the adoption of remedial measures without undue delay. The results laid bare, after a most careful and thoughtful inspection, cannot be ignored if we are to continue to lay claim to municipal progressiveness. For, as the report states, 'There are few conditions found in the slums of European cities, that have not been revealed in Toronto, the difference being one of degree only.'

"Within the next succeeding few years, with the great expanse of territory to be tributary to the heart of the city by the building and extension of the civic car line system, there need be no excuse for the continued existence of the lamentable conditions which now obtain in certain of our congested districts."

Referring to the construction of a better class of houses on town planning lines, he said:

"No greater boon could be conferred upon the people by our philanthropically-disposed business men than an investment in vacant land to be utilized for the erection of houses, to be disposed of on the co-partnership basis to those of modest means who desire to acquire healthful homes for themselves.

"A Committee has been formed and is now busily engaged in collecting material and formulating a plan which I hope to be able to submit to Council for consideration within the next two or three months."

Concerning the question of the providing of diagonal streets to meet the street congestion, the mayor said:

"The Civic Improvement Committee is entitled to our thanks for the very comprehensive report on city planning lately present

ed. For many years one matter taken up in this report, viz., that of construction of diagonal streets, has been before the public. To my mind it is the rational and direct method of relieving the congestion that exists on our streets, and should be taken up seriously during the present year."

Civic Guild of Toronto

The Civic Guild of Toronto is composed of citizens who have at heart the general improvement of the city. The Guild prepared plans looking to the extension of parks, the providing of playgrounds and the construction of better main avenues for purposes of transportation. Its monthly bulletin has done much to arouse interest in these much-needed reforms.

Montreal City Improvement League

In Montreal, active work has been carried on for some years by the City Improvement League, its first annual report having been presented in 1910. It has been a valuable means of co-ordinating the work of those interested and it has been useful in moulding and directing public opinion on civic affairs generally. Amongst its objects of study are the housing problem in Montreal, over-crowding and slums, as well as city planning and city improvement.

Metropolitan Parks Commission

This League has, for the second time, placed a bill before the Quebec Legislature to provide for the establishment of "the Metropolitan Parks Commission." This bill, if made law, would constitute the Commission a corporation with powers "to make and execute and carry out plans for the establishment of public parks, squares, promenades, boulevards, thoroughfares, recreation grounds, playgrounds, streets, baths and gardens in the island of Montreal and other islands contiguous thereto. The revenue for this Commission would be derived from "an annual assessment of one twentieth of one per cent. on all cities and towns situate on the island of Montreal."

Several plans for the embellishment of the city have been put forward, chiefly in the way of fine boulevards and main roads for communication. The most recent is that of two driveways, which, including wide boulevards, are each some 175 feet wide. These extend, one on each side of the line of the power canal, for a distance of seven miles. The object is to permit of vacant land adjacent thereto being laid out on the garden town-planning scheme. The mayor and board of control are fully alive to the needs of the situation, and during 1911 the Council appropriated for the purpose of new

parks nearly $250,000. The land surrounding the site of the proposed filtration plant will be used for park purposes.

The provincial government of Quebec appointed a Commission on Parks, etc., which has presented a most valuable report.

Town Planning by Railways

I would like also to refer to the work on town planning done by the Grand Trunk Pacific and the Canadian Northern railways—the former in the planning of the city of Prince Rupert and the latter in the city of Port Mann. Then, too, something should be said concerning the scheme of the Canadian Northern in the acquisition of some four thousand acres to the north of the city of Montreal, a portion of which will be laid out on the most approved lines of town planning.

British Columbia Town-Planning Law

The Province of British Columbia now has upon its statute books, a law making town planning possible by cities, giving them power to include their environs. The Government has already planned and developed a portion of Point Grey situated in the suburbs of Vancouver.

In other portions of Canada, too, interest has been manifested in both housing and city planning, so that it is evident that Canadian cities are alive to the situation, and, in the near future, we can hope for more efficient practical work.

The Ottawa Improvement Commission

I would refer, in conclusion, to what has been accomplished in Ottawa. The recent pronouncement of the ratepayers in favour of the city being made the centre of a Federal district, affords the opportunity to refer to this most important question. Consequent upon arrangements made by the corporation with the Dominion Government, an Improvement Commission was appointed. Vacant and acquired land has been made into parks and driveways, and areas secured which, otherwise, would, most probably, never have been reserved for the people. Plans have been put forward from time to time by those interested in the improvement of the city, but as yet nothing definite has been settled upon. That housing conditions are not of the best is a fact which has been demonstrated; that they should be improved is acknowledged. As to the general lay-out of streets within the city limits, it must be owned that replanning can be carried out with benefit to all. That there should be some intelligent control of the way in which the outskirts within the city limits proper, as well as of the environs beyond, should be planned, goes without saying, if

VIEW AT DRESDEN, GERMANY, ILLUSTRATING THE POSSIBILITIES OF IMPROVEMENT OF RIVER FRONT AT OTTAWA AND HULL

this, the capital city of Canada, is to be maintained as nature made it, the ideal spot for the most beautiful capital in the world.

Proposed Federal District

It must further be noted that it is essential that both sides of the river Ottawa be included in any Federal District plan that might be adopted. The difficulties to be met in such a scheme of improvement as must necessarily be adopted, are, under present conditions, more or less insurmountable, and a radical change must be instituted. Both Ottawa and Hull have to be considered in the scheme, and I have no doubt a way can be found out of the difficulty.

A map indicating the growth of Ottawa year by year shows that the suburbs have been planned and have grown year by year without any special reference to the city as originally planned; and certainly, without due consideration as to their ultimately becoming a part of a greater Ottawa. Unfortunately, no action has been possible on the part of the city to control or direct the development of these environs.

As I said before, in view of the position of the two cities of Ottawa and Hull, it is quite evident that both must be considered as a unit if anything like uniform and harmonious results in city planning are to be secured. The city of Dresden affords an example of what is possible in a city situated on both sides of a river. The shores on both sides are very similar as to formation and outline to those at Ottawa, and at least this portion of the city planning of the Federal capital might be considered with reference to what has been done at Dresden.

The Federal Government should secure ample land for the erection and extension of departmental offices, such as will be required when Canada has a population ten times that of to-day. Very unwise, indeed, would be the policy looking to anything else. We have simply to look to Washington to learn how costly such mistakes may prove to be. Having learned the lesson, we should apply what we have learned in our own country.

There is no reason why the people of Ottawa should not be the best housed people in America. There is every reason why we should be able to say: "Here is the model city of Canada, here slums are unknown, here each person dwells in a good house with the most healthy environments, in the way of ample playgrounds, model parks and gardens, with streets, roads and boulevards planned, laid out and kept as they should be." It should be our ideal to make it

so sanitary and beautiful that all Canadians could point to it as having lower morbidity and mortality rates than any other of the world's capitals—and all this at the minimum cost to the ratepayers. This is not chimerical; it can be done, and, in the interests of Canadian humanity, should be entered upon at once in all sincerity, and upon lines of an enduring character.

There are two important factors in the question of national conservation, the physical and the vital. The former relates to the protecting of our land, our forests, our minerals, our waters, our sunlight, our fresh air; the latter, to the prevention of diseases, to the health and to the prolongation of life. In housing and town planning we are dealing with most of the former and all of the latter.

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*The name of this river is incorrectly spelled Pas in the text.